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Original Articles

PRESIDENT'S ADDRESS*

SOUTHWESTERN SOCIETY OF ORTHODONTISTS

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WITH a keen appreciation of the honor you have conferred upon me, I take great pleasure in welcoming you to Abilene, Texas, for the fourteenth meeting of the Southwestern Society of Orthodontists. It has been fifteen years since the organization of our Society, for, as all of you know, our last regular meeting was postponed at the request of the Board of Censors. This was a very timely suggestion, by which we all have profited.

During the past fifteen years the Society has greatly increased in members and in power. The science of orthodontia has made great advances, largely through the work of some of our members, for some of the outstanding men in orthodontia today have had as a stepping-stone, the Southwestern Society of Orthodontists. This Society has always been wide awake and has acted as a clearing house for the discussion of new ideas in an impartial and scientific manner.

Time will not permit my dwelling upon the different phases of advancement of orthodontia, for we have a very full program, which is a tribute to the splendid work of the Board of Censors and of the executive committee. I shall, however, confine my remarks to a very few recommendations for action, which many of our members believe will act as a boomerang to the betterment of the Society and to the advancement of orthodontia.

Before making these recommendations, I should like to pay respects to some of the members of the Society, who have been taken from our midst

*Presented at the annual meeting of the Society which was held in Abilene, Texas, October 15-17, 1934.

since the last meeting. All of us realize what a consolation and benefit our great friend and scholar, Martin Dewey, was to the Society. He was always an attending member; a meeting place was never too far away, and weather conditions were never too bad for him to be with us with his fine scientific contributions. All of us admired him, and at each future meeting of the Southwestern Society we shall miss him. The late Dr. E. E. Moore of Fort Worth, always had an open mind for the reception of better ideas for orthodontia, and he was willing to put into practice the advantages which he gained from our meetings. I am sure that all of us would like so to live that when the time comes for us to wrap the draperies of our couch about us and lie down to pleasant dreams, we too can be remembered in the same friendly manner as these men have been remembered.

There are always many problems of a scientific nature which are present for our consideration; however, most of these have been written about by students and scholars who have had many more years in practice and experience than I, and have conveyed to your minds a clear concept of the science of orthodontia, and the rôle it plays in the healing art, perhaps better than I could. Like all sciences, orthodontia has developed through necessity. The obvious need of relief in some of the gross forms of deformity of the bones of the face and nose stimulated dentistry to apply its specialized skill to reduce or correct the malformation through movement of the teeth. This correction is a biologic growth and may be readily traced to the physiologic forces of growth that influence the efforts put forth by the operator, far beyond his power to conceive. Nature is the greatest healer of all ages; and if it were not for the healing power and growth that nature gives to an individual we, as orthodontists, would be lost. The results obtained, however, by the use of properly constructed appliances are very gratifying when a study of all surrounding structures and a proper diagnosis have been made. This is not the case, however, as some of the laity have been led to believe, when store-purchased appliances such as the twenty-five-dollar apparatus which is advertised to reduce the entire deformity are used. These have obtained the popular support of some dentists who have been buying them from the inventors, who are in turn becoming wealthy by thus beguiling their brother practitioners. These shotgun appliances have done more harm than good, and the use of the apparatus has been and is the greatest handicap that orthodontia has to encounter. The simple way of diagnosing malposed teeth, based upon only the mechanical positions of the arches and the teeth in their relation to each other, without x-ray pictures and without seeing the patient, examination made for hypertrophied lymphoid tissue, or to find the relation that the teeth bear to the anatomy of the entire head and face, is in my opinion, ridiculous and cannot be done any more than a thorough and complete diagnosis of tuberculosis can be made by a physician without the use of the x-ray examination or the stethoscope.

It remains with us to educate the laity to the fallacies of such treatment, and by a united effort to try in some manner to stop the advertising of such

universal apparatus in some of our leading journals. It is not my intention to belittle these journals, however; for their editors are very fine men, and most of them will cooperate with us if only we will make our demand strong enough. One of the leading men in our profession has said that perfecting an oil painting and performing a surgical operation are both technical tasks; a painting is not executed by a brush manufacturer directing the artist how to wield the brush, nor is a surgical operation performed and directed by the manufacturer of artery forceps. A physician or surgeon would not ask guidance and direction from the manufacturers of devices; he would laugh at the thought of such a thing.

There is real tragedy for orthodontia as a science in this menace, and orthodontists collectively should protest against it and should insist that if laboratories must tell the dentist how to treat malocclusion, they should, at least, refrain from giving him advice and direction which if carried out might easily be the basis for malpractice suits, to say nothing of the injury which might occur to his child patient.

A great deal of emphasis has recently been placed upon the importance of early attention to the deciduous teeth. At the last meeting of the American Dental Association resolutions were adopted endorsing such care, and a new department of dentistry for children was created. Along with this comes public health dentistry or the dental clinic for children. This is a big problem, and it seems to me that the profession had better assume this responsibility as far as possible with the help of the public-minded laity rather than stay on the outside and perhaps be dictated to by them. The practice of juvenile dentistry is a wonderful phase of our work, which will, I believe, in the very near future cast aside the old belief that the deciduous teeth are only temporary, and that to have them taken care of is only a waste of time and money. The laity is realizing more and more the need for children's dentistry, the results of which will be returned a thousandfold in the health and prosperity of the next generation, and will be a very definite asset to the people of the nation. The most value asset of a nation is the health of its people, and every one should do all he can to conserve his health. It is imperative that parents should take special care to conserve the health of their children. I believe that it is a part of our duty as guardians of public health, that we owe it to ourselves, our clients and our profession, to do all that we can to assist in this education for better dentistry for the child, and explain to the parent that it is a fundamental principle of good health.

There are one or two recommendations that I might suggest which I believe will be for the betterment of our Society as a whole. One of these is the organization of a state society of orthodontists. The state of Texas does not have an active society of orthodontists; it might be better that this be left until the next meeting of the state dental society, which will be held in Waco. The membership of the Southwestern Society of Orthodontists comprises men from seven states, and such an action from this Society might not meet with their approval, but it certainly should be considered. Some of the aims and purposes of such an organization would be: first, to advance the

science of orthodontia in all its phases; second, to promote a friendlier feeling between orthodontia and dentistry generally; third, to encourage the contribution of the science and art of orthodontia in the interest of public health; fourth, to cooperate with dental organizations, societies, and associations by lectures and meetings for the purpose of enriching our fellowship and enhancing the progress of the dental profession. Of course there are many other reasons, but these are some of the most important.

Another recommendation that I should like to suggest, and one not only that is very important but that can be unpleasant if not handled in the proper manner, is the rewriting of our by-laws and constitution. The new method of reorganization of the American Society of Orthodontists makes it imperative that our constitution and by-laws be rewritten..

The local dental society has not spared anything for your comfort at this meeting, and the executive committee has prepared a very interesting and instructive program which I am sure we shall all profit by and be well pleased with. This is not where the West begins, but where the West *is;* and the hospitality which I know you will receive here will cause you, I hope, to agree with my statement.

REPORT ON THE PRESIDENT'S ADDRESS

The members of the Committee wish to compliment the President on a most able address; we found it in the main most timely.

The paragraph dealing with the education of the laity and recommending that an effort be made to discourage the use of laboratory appliances we heartily endorse.

The article dealing with early attention to the deciduous teeth is also endorsed by the Committee.

The recommendations dealing with the organization of a Texas State Orthodontia Society, the Committee could not recommend as we feel that it would not be best to consider an organization of this kind by the Southwestern Society, but that it should be considered separately by the members in the individual states.

The recommendation dealing with the rewriting of the Constitution and By-Laws of the Southwestern Society, the Committee would suggest be postponed until after the reorganization of the American Society of Orthodontists.

Respectfully submitted:

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FAIR PLAY FOR ORTHODONTIA*

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THE main purpose of dental organizations is to advance the arts and sciences of the profession with a full understanding and appreciation of its responsibilities to the public, which it serves. Dating from its earliest beginning in the United States, dental education has been generally recognized as the most important means for this development. Prior to 1839 there were no dental schools; dentistry was a simple trade and a mechanical subsidiary to medicine. Dentistry first began to attain importance in 1839 and 1840 when the first dental journal, the first national society of dentists and the first dental school were established. For almost thirty years thereafter dentistry remained superficial and practically without legal restrictions for its practice. It continued to be regarded generally as a mechanical trade that any one might enter. Nearly all those starting the practice during this period qualified by serving as apprentices in the offices of established dentists.

In 1868, in response to cumulative demands for greater responsibility and efficiency in dental service, the legislatures of three states enacted laws that defined dentistry and specified educational requirements for a license to engage in practice. Other states rapidly followed with licensing systems. It is believed that the greatest strides for dentistry were made during this state licensing period. Educational standards were raised, and codes of ethics were established which elevated dentistry to the status of a profession.

A few progressive dentists and several physicians who had a greater appreciation than many of their confreres of the relations of mouth and teeth to human welfare, cooperated in an effort to improve the quality of dentistry and elevate it in public respect by associating it intimately with medicine. An unsuccessful attempt was made to establish courses of instruction for dentistry in medical schools and thereby give it proper distinction as a specialty of medicine. This historic rebuke was unfortunate for dentistry, as it was found difficult to provide instruction for dentists in the medical sciences of a quality to hold the position of dentistry as a specialty of medicine.

Dentistry was forced to stand on its own feet in independent colleges without the supervision and financial support of the large universities. Almost all the dental schools operated on a commercial basis. It became the policy of even the small number of schools attached to the leading universities to let the dental school operate as a separate unit on a commercial basis. Financial returns were very handsome in institutions which were efficiently managed. The quality of education was usually made subservient to the maximum net profits.

*Read before a meeting of the Southwestern Society of Orthodontists, Abilene, Texas, October 16, 1934.

The National Association of Dental Examiners was organized in 1883 and the National Association of Dental Faculties in 1884. It was not until after the National Council of Dental Education was established, in 1909, that any uniform standard of education for dentistry could be satisfactorily enforced. During the period when commercialism was running rampant, important disagreements disturbed the relationships between the National Association of Dental Examiners and the National Association of Dental Faculties. In different ways, the associated examiners had been recognizing dental schools that were not regarded as reputable by the associated faculties, and had been challenging the reputability of other commercial schools that were members of the Association of Dental Faculties. The National Council of Education has since directed the educational requirements as a representative organization of the profession. In 1922 it established a grading system which forced the elimination of the commercial schools. It now cooperates with the American Association of Dental Schools in maintaining and determining standards for dental education. The change has clearly proved that neither graduate nor undergraduate schools can produce the highest quality of education and humanitarian service on a fair basis by finances consisting of fees paid by students and patients.

If the evolution of general dental education is compared with the methods used in the development of graduate orthodontia education, one finds a great similarity.

It is well for us to remember that the specialty of orthodontia first came into existence as the major specialty in dentistry when Dr. Edward H. Angle gave his first four-weeks' postgraduate course of instruction. That was in 1900 and was a result of the general broadening of dental health service with its concurrent mechanical, esthetic, and therapeutic demands. It became apparent as early as 1900 that dentistry covered such an important and complicated field that the general practitioner would be unable to master and practice expertly all phases of it. As a consequence, several important specialties have arisen in addition to orthodontia. These are making an important place for themselves as a result of the advances made in research, and the more exacting demands on the part of the public for highly qualified practitioners in special lines of practice.

Oral surgery has since acquired the distinction of an accredited dental specialty; and other specialties, such as periodontia, prosthodontia and pedodontia, are attaining concreteness and are rapidly increasing in number. The scope, complexity and difficulties that arise in preparing for the practice of any one of the specialties are of such magnitude as to cause one to believe that it is impossible for any one to acquire a full knowledge of its possibilities and, I might add, its responsibilities.

To meet the demands on the part of the profession and the public for specialized services in orthodontia, dentistry followed the already old and antiquated system of establishing proprietary schools. The promoters of the first orthodontia schools were not so much concerned with the future educational standards of orthodontia as those who were responsible for the first

dental schools. Dentistry made a vain effort to hold fast to medicine and be taught in medical schools as a specialty of medicine. This failure on the part of medicine to give dental education the recognition it deserved has always been considered by unbiased authorities as a great handicap to dental education. Dental history nowhere indicates that any real effort was made by those interested in establishing the first postgraduate schools in orthodontia to attach them to dental schools where they properly belonged.

According to the American plan of providing education it is the inherent right of chartered dental colleges to teach all branches of dentistry. These institutions were operating under the rules of the National Association of Dental Faculties and the National Council of Dental Education at the time the proprietary orthodontia schools were started. It is the business of these organizations to promote and develop the proper standards for dental education. They have done a most creditable work during their existence. The accredited institutions are equipped with teaching staffs, laboratories, clinical facilities, and all the essentials necessary for the efficient teaching of specialized orthodontia. While some of their graduate courses of training may be criticized as weak, it must be remembered that they have had comparatively little moral support from dental organizations interested in the development of better educational standards.

The first organizers of postgraduate schools for orthodontia, however, turned away from the dental schools, as a matter of personal preference and followed the old proprietary system, which was already being placed in disrepute. The proprietary system was still recognized as an acceptable method of supplying dental education by the rank and file because the vast majority of men in practice had obtained their dental education in schools of this type. The principal motive for establishing independent postgraduate schools was to maintain private control and ownership. This system made it possible during the transitional period to serve their personal interests to the best advantage under the guise of sound business and good professional ethics.

The fees for these courses were based on all the traffic would bear, or about $100.00 a week. In no other profession have such exorbitant fees for postgraduate education ever become operative and been perpetrated upon a profession year after year. Some schools did and are continuing the exploitation of certain patented appliances and ridiculing the use of other popular standardized systems. The students of some of these schools even go so far as to question the methods of orthodontists who do not use a certain system for treatment. Such conceit and narrow-mindedness are not considered good practice even in the field of merchandising, let alone in a profession where knowledge, skill, and ability are prime factors.

It is the customary thing for some of these schools not only to advance one style of orthodontic appliance at the exclusion of all others, but also to insist upon the use of the owner's textbook and theories of practice to the exclusion of others. In addition, students of certain schools with mistaken ideas consider their theories of practice irreconcilable to the democratic principles of the American Society of Orthodontists. They organize separate societies with the same objects of the American Society of Orthodontists, but

restrict their technical knowledge to one school of thought. This makes it impossible for all orthodontists to meet on a common ground for the common good. Such a division in the ranks greatly hinders progress.

It is true that orthodontia has had a great growth in the past twenty years under the short course of six or eight weeks' postgraduate training in proprietary schools. This growth, however, has been restricted mainly to number and has not been in adequate preparation of orthodontists. Many of us who have pioneered in orthodontia took our training in these schools about fifteen to twenty years ago. The course of instructions was about six to eight weeks. Since that time orthodontia has developed into a specialty requiring an extensive knowledge and skill in both medicine and dentistry. Since 1900, dental schools have lengthened their courses three years and will soon be lengthened four years. Yet we fail to support properly the lengthening of courses to eight or nine months in the dental colleges with a curriculum and staff of instructors that would do much toward elevating the standard of orthodontia.

Orthodontia has made a creditable name and place for itself, not so much on account of the schools or because of the training its students received in preparation as upon the character of the men selecting orthodontia as a specialty. Orthodontia in years past was especially fortunate in this respect. It so happened that almost all were earnest and energetic men with a high regard for professional ethics. Some credit is due the owners of these schools for using reasonable precaution in admitting applicants. Considerably more care along this line used to be exercised than has been done in more recent years. Whereas it used to be customary for all to take a course of instruction in one of the proprietary schools, a surprising number in recent years have been representing themselves as specialists after spending three or four weeks in somebody's office or private school.

In two states in the Southwest a survey of men entering the specialty during the last seven years reveals that twenty-six entered the specialty, of which two were graduated from a one-year university course, fourteen were graduated from short-term training schools, and the other ten received their training in private offices or no special courses of instruction. Only nine are practicing orthodontia exclusively. Sixteen are practicing orthodontia and specializing in orthodontia in combination with one or more branches of dentistry. Only one of the twenty-six has become a member of the American Society of Orthodontists.

On the face of things it seems that orthodontia training, as it is reflecting itself in the qualifications of those entering the specialty, is about on the same educational plane it was twenty-five years ago. It is a sad commentary that orthodontia has failed to improve its educational standards for practice to any appreciable degree in over a quarter of a century. Is it not time such a deplorable situation was corrected?

Those having taken the six and eight weeks' course of instruction in an attempt to qualify for the practice of the specialty fully realize they should have had a much better and longer course of training. When orthodontists were few in number, they were able to band themselves together and have

leading educators come and give them supplementary courses of instructions once or twice a year in an effort to counterbalance their short courses of training. Orthodontists of the past have been largerly self-made in the school of experience, which is no longer considered a modern system of education. The men who have made a real place for themselves have succeeded in spite of their inadequate training in orthodontia. The public demand and the sound reasoning on the part of the general practitioner, that it was too complicated and difficult to mix with the daily routine of practice, went a long way in making their success possible.

Those who entered the specialty in its early years were earnest in their intentions to qualify for membership in an orthodontia organization. Almost all of them did, but with the more rapid growth in number we find many pretending to be specialists and mixing the specialty with other branches, who have no desire to become members of orthodontia societies. They consequently are beyond the reach or control of organized orthodontia, to improve through the forces of its educational system or moral code.

The general practitioners are naturally skeptical of men being adequately prepared in a few weeks for the practice of a specialty which they recognize as being very complicated. Only too often some of their confreres have taken special courses of instruction in less exacting specialties, such as exodontia and pedodontia, and have tried the exclusive practice and failed as the result of inadequate training and prestige. If they had taken a nine months' course of instruction in an accredited university and returned with a special degree, their preparation would have cost little more in time and money, and with this additional prestige and knowledge they would have had a fair chance for success. These worthy specialties are being held back year after year by the failures of men who attempt to specialize in them exclusively, and in combination with other branches, without obtaining proper and adequate training.

I believe the right kind of dentist can take the nine months' course of training in preparation to enter a specialty as offered by some of the universities and be more than reimbursed the first year in practice for the added cost in money and time over the short term courses of training. It is reasonable to presume that the conservation of time and quality of service rendered in treating cases contracted the first year would practically make up the difference. They would then have the more advanced knowledge and skill in their favor down through the years.

The organization of the American Board of Orthodontia in 1929 was a forward step; the Board has very noble purposes. It was designed to supplement the short-term educational system and strive for its improvement. The chief activities of the Board are very laudable, but the system upon which it is apparently operating will do little toward correcting the basic faults of an obsolete system of education.

The first object of the Board is to establish standards of fitness for practitioners of orthodontia. Nearly every one will agree that a higher order of training is essential to orthodontia practice. Furthermore, there is actual

need of a body to designate standards of study and other qualifications for those who are to represent the specialty of orthodontia.

One of the chief aims of the Board is to improve the teaching of orthodonita. With a very inadequate system, some thirty years old, sadly needing a revision, the Board has not seen fit or had the courage in the five years of its existence to endorse the recommendations of the National Council of Dental Education relating to postgraduate instruction for specialization. The recommendation of the council is that graduate instruction should be established in accredited dental colleges. It would seem that such an action would be about the first order of business, but it has so far failed to make a concerted effort to elevate or approve a standard of postgraduate instruction for specialization. It appears that the Board should find it easy to cooperate with the Dental Faculties Association and the National Council of Dental Education in promoting these activities for the benefit of the public and the profession.

The second chief activity of the Board is to investigate the fitness of schools and of private instructors and to prepare lists of schools and instructors which shall be available to the profession. While such a list would do much good and is greatly needed to place orthodontia education on a higher plane, no such a list of schools giving acceptable courses of instruction has been published. Announcing and publicizing an approved list would immediately place the objectionable proprietary schools in disrepute. The policy of investigating private instructors and giving them recognition by endorsement is impracticable and unwarranted for several reasons. The fact, however, remains that the nature of the Board's duties and the strategic position it occupies make it the best agency at the command of orthodontia to place training schools upon a proper standard if the Board will but function in this direction.

The Educational Committee of the American Society of Orthodontists is charged with practically the same responsibilities in improving the systems of education, but the work is too burdensome for a committee to perform without some financial assistance. The income of the Board would make it possible to provide suitable compensation for the work. Such a provision would make it possible for the Board to do effective work along this line. The certified list of the Board numbers about eighty. This represents about a $4,000 income in the five years it has operated. The income has been on the average of about $1,000 a year during depressed times.

Third among the chief activities of the Board is to arrange for, control and conduct examinations to test the qualifications of those who desire to practice orthodontia, and to confer a certificate upon those who meet the established standards of the Board. The work of the Board has been confined almost wholly to the promotion of this third activity. According to the present rules governing qualifications for examinations, members of the profession are divided into three classes, according to the length of time they have practiced orthodontia.

Class I—Those who have practiced orthodontia fifteen years or more.

Class II—Those who have practiced orthodontia exclusively seven years, but less than fifteen years.

Class III—Those who have practiced orthodontia exclusively less than seven years but at least five years, or an equivalent to be determined by the Board.

Nearly all of those certified have been outstanding men and worthy to be accepted on their individual records without standing an examination or improving themselves.

With a minimum requirement of five years in exclusive practice, or its equivalent, to qualify for examination or to apply for a certificate, this plan deals chiefly with a group highly qualified to practice orthodontia. Its principal usefulness is lost to the good of dentistry and of the public if it deals only in certificates for the upper class and does little or nothing to improve the basic requirements in graduate instruction for specialization. No provision is made to lend its elevating influence to the men who have been in exclusive practice less than five years. It is in the beginning or first years of practice that men are receptive and ambitious to gain more knowledge. It would seem more feasible to provide another class embracing the men qualifying for admission to the American Society of Orthodontists.

The subject of legislation relating to specialization is of vital importance. Arizona and Illinois have already established legal requirements for specialization. The Tennessee State Dental Society has prepared amendments to certify the qualifications of practitioners for specialization. The Oklahoma State Dental Society is completely revising the dental laws of the state. The Oklahoma "Dental Act" will place all the major specialties of dentistry under a licensing system. Tennessee and Oklahoma will introduce their programs to the respective legislatures when they convene in January, 1935.

The Arizona law requires a one year course of orthodontia training in a college or university approved by the Board of Examiners. Although the law does not specifically require a dental degree or dental license, in order to obtain a license to practice orthodontia as a specialty the law requires 320 resident hours of college work and an examination in subjects on a percentage basis so high as virtually to compel a candidate to take a full dental course of training. For all practical purposes it makes it compulsory to have a dental license before acquiring an orthodontia license; otherwise an orthodontist could not gain admittance to dental societies and be able to fraternize with dentists. The Illinois law requires five years in general practice, and Tennessee will require three years in general practice to qualify for examination to become a certified orthodontist. The laws are elastic in providing additional requirements. The Oklahoma Dental Act will make it mandatory upon every dental practitioner to acquire a special license before being privileged to announce to the profession or the public that he is a specialist in any one of the major branches of dentistry. In order to qualify for examination, the applicant shall be a registered dentist in the state and have thirty semester hours (one year term of special graduate work in a dental school approved by the Board), or its equivalent. The equivalent will be determined

by his record of special training and experience and will be left to the discretion of the Board. Special provision is made for the regular Board to select and appoint special examiners if the Board finds it desirable. The applicant shall have the right of appeal to the regular Board for any injustices suffered at the hands of a special examining committee, and in turn to the Supreme Court of the state, the same as other applicants and practitioners coming under the law. The present privileges of the general practitioner will in no way be restricted so long as the dentist does not represent himself as being especially qualified to practice a certain branch of dentistry. The special license permits the holder to announce himself as being a specialist in any one or more branches of dentistry in which he acquires a special license, or it may be used in combination with a general practice.

It takes nothing away from the ethical practitioner unless reasonable preparation for his own protection and that of the profession and public could be considered an unfair sacrifice of personal rights. These regulations will protect the profession and the public against the charlatan who exploits the public and the adventurer who is overanxious to be a specialist but is not willing to qualify. Those entering the specialties owe it to themselves to become reasonably well qualified so that they will have a fair chance for success. After having earned a special license, they will have acquired a certificate of real prestige and value.

There is perhaps worse exploitation of the other major branches than that taking place in orthodontia. It has become common practice for general practitioners with little or no special training or experience to engage in sharp practices by representing themselves to be specialists in different branches of dentistry. Many others with honest intentions but with greater ambitions than they have qualifications are constantly entering the exclusive practice of different specialties. There are not any properly recognized standards for their guidance. It is much easier for dentists with either honest or dishonest intentions to represent themselves as specialists in the other branches than it is in orthodontia. They have greater assurance of success because the other branches are simpler to handle and a poor quality of service is not so conspicuous as in orthodontia.

The orthodontists of Oklahoma, after being invited by the legislative committee of the state dental society to suggest remedial legislation, found themselves greatly handicapped in their efforts to sponsor a program of legislation. They have earnestly endeavored to set up a model law that would be fair and reasonable and acceptable as a standard. The legislative committee of the American Society of Orthodontists was not prepared to submit any well-designed and properly approved plans for guidance. The American Board of Orthodontia specifically declares that it does not have any interest in legislative matters. The American Board is an active organization with financial support to function effectively in elevating the educational standards of orthodontia and should be the most logical agency to study legislation.

With legislation in the air as a useful and practical means of supplying a better quality of health service to fulfill public requirements, it is already

past time that a fair standard was being established. The legalization of orthodontia and other specialties by several states in a short period of time indicates that the movement may by popular appeal, spread across the country within the next few years, in much the same way in which dentistry gained legal recognition. But, unlike dentistry, it is starting on widely different standards. In Illinois there is the triple-five standard of five years for a dental degree, five years in general practice, and five years in exclusive practice, to become a certified orthodontist. About one-half the average lifetime of the individual is being utilized to become an approved orthodontist under this system. Illinois has practically forced its native sons who take up dentistry to leave the state or to spend five years in general practice and sacrifice it if they want to become orthodontists. The Illinois system approaches monopolistic legislation mainly by reserving the field of orthodontia for its present-day practitioners. With Tennessee requiring three years in general practice, it is following the Illinois plan in a modified form. Arizona requires a one year special course of training in orthodontia, but does not specifically require a dental degree or dental license. Oklahoma will require a dental license and one year of special training in orthodontia or its equivalent, without demanding a term in general practice. Now, let us consider the effect of such a wide variation of inconsistent requirements. College men residing in Illinois and Tennessee who are ambitious to become orthodontists will look with favor on Oklahoma, with a one-year term of graduate training, or to the other states where nothing more than a dental license is required. While we naturally appreciate the value of a well-rounded-out knowledge and clinical experience of dentistry as a prerequisite in qualifying for the practice of a specialty, we must place the educational standards for orthodontia on a more uniform, practical and reasonable basis if orthodontia is to get in line with the established American system of education.

While there may be need for a better and more universal standard for teaching orthodontia in both the undergraduate and the graduate schools, the fact remains that with high class fundamental education being provided and the courses of instruction in undergraduate schools being lengthened, it is inconsistent and unfair to put up three- and five-year terms in general practice as the principle standard of measurement to qualify for the specialized practice of orthodontia. Unless special attention has been given the subject of orthodontia, which is rare, the average practitioner has no more scientific knowledge of orthodontia diagnosis and treatment after five years in general practice than he had in the beginning, and frequently not as much.

If it is possible to pass laws some of which are very impractical and out of step with present-day educational standards, is it not reasonable to presume that practical and sensible legislation might be enacted? Furthermore, if it is sound for the practice of general dentistry to be regulated by law, is it not just as logical to go a step farther and place the specialties under legal supervision to develop and maintain a higher quality of public health service?

It may startle the otherwise casual observer to be brought to realize that in no other branch of dentistry or medicine is quackery running more rampant

than in orthodontia. With the dental profession and the public becoming more alert to the importance of and necessity for orthodontia treatment, commercial orthodontia treatment laboratories have been growing in number, and many are doing a flourishing business in selling "hand-me-down" appliances. Some of the proprietary dental journals less than a year ago were carrying as many as six different advertisements by these laboratories in each issue. If you consider the combined number of these laboratories with their personnel and the amount of money it takes to keep such an industry going, it means that the legitimate lines of dental trade and the profession are being drained of thousands upon thousands of dollars.

In years past, these laboratories appeared to be a rather insignificant lot, but in the last year or two some of the large prosthetic laboratories with high class reputations have concluded they are missing out on the gravy and have started into the business in a big way.

Not long ago, some adventurers started up a direct mail-order denture business. These exploiters were leading the public to believe that dentures could be satisfactorily supplied the public by the mail-order route, by sending them a combination biscuit bite and impression, just as the mail-order orthodontists would have the dentists believe that malocclusion can be satisfactorily corrected by sending them plaster casts for a diagnosis and appliances. One is about as ridiculous and nonsensical as the other. About the only difference in the two schemes is that the plate manufacturer deals directly with the public while the appliance manufacturer appeals to the dental profession for business.

These methods are nothing less than racketeering dentistry, as they are not within the letter or spirit of the laws regulating business and professional conduct. The primary object of the commercial orthodontia laboratories is to sell appliances. The laboratories are without any professional code of ethics to regulate their business conduct, and in their ambition to gain patronage they make many misleading and false claims. They would have their prospective patrons believe that malocclusion is comparatively easy to correct if they will allow the laboratory to diagnose the case from plaster casts, make the appliances and send the dentists some instructions. It is folly to presume that accurate diagnoses and prognoses can be made from plaster casts without any opportunity to study all phases of the case. Many of these laboratories lead their prospective patrons to believe that they are authorities on orthodontia diagnosis, prognosis, and treatment. Some are known to be performing this kind of service without having had any special training or experience other than that which they obtained in a trade school of mechanical dentistry, or an apprenticeship in some orthodontia laboratory. Others are operated by dentists of doubtful qualifications. If they were really qualified and reliable orthodontists, they would be in private practice and not in commercial laboratories.

A large number are making and selling appliances which are considered obsolete and might be classed as antiques and suitable only for a dental museum to illustrate the evolution of orthodontia appliances. The old re-

movable Jackson type of appliances seems to have the strongest appeal because it can be made to fit.

Almost all the materials used in making their appliances are purchased outside the regular channels of dental manufacturing and trade. The dental manufacturers and supply houses lose all this appliance business that otherwise would come to them if the practice of orthodontia were restricted to the private practitioner where it rightly belongs. The legitimate dental supply houses should therefore welcome a crusade against these racketeers.

These laboratories hold out special inducements to interest dentists by offering illustrated booklets, charts and other tokens, to build up mailing lists for prospective business. They lead dentists to believe that orthodontia can be made easy and remunerative if they will but lean on them for appliances and instructions; it would be infinitely better for the dentist to use his own knowledge and refer to a good textbook in preference to placing all his trust in the laboratories.

A false pride or feeling of embarrassment prompts many general practitioners to patronize the commercial orthodontia laboratories in preference to seeking the counsel and advice of the orthodontists in their community. This is undoubtedly accentuated by the idea that the orthodontist is so jealous of his own specialty that he does not believe a dentist should attempt any kind of orthodontia treatment. Although it is true that the great majority of general practitioners could spend their time more profitably on work which they are better qualified to perform and could safeguard their reputations by reducing bad advice and failures to a greater minimum, and assigning all their orthodontia problems to a specialist, the fact still remains that it is the dentist's moral right and legal privilege to practice orthodontia if he considers it expedient to do so. Broad-minded orthodontists have no desire to criticize the dentist for practicing orthodontia if he uses good judgment and displays reasonable knowledge and skill. When he is in doubt, it is his professional duty to refrain from seeking the faulty advice of those who would degrade the practice by inefficient and unethical methods. Those wishing to practice orthodontia should place more confidence in textbooks and scientific journals, and should consult their orthodontist confreres. The right kind of an orthodontist always takes a broad and liberal view of the dentist's orthodontia problems, as a result of his years of experience and the sympathetic understanding of the many varied conditions and circumstances under which the dentist has to work.

The pertinent point of the argument is this: A much broader and more creditable orthodontia service could be rendered the afflicted if general practitioners would more frequently consult the more reliable and ethical practitioners of orthodontia. No rational physician with a baffling case on his hands requiring a truly scientific diagnosis and treatment would think of sending some pharmaceutical house a picture of his patient, with a notation as to respiration and pulse, to make a diagnosis and prescribe a plan of treatment by mail, to safeguard the health and life of the patient. He would call specialists to view the patient and all the clinical factors. Dentists should follow the precepts of the medical profession along this line.

CONCLUSIONS

If the specialty of orthodontia is to rise to its proper professional plane, a bold stand will have to be taken in approving a higher and more definite standard of educational requirements for specialization. The American Board of Orthodontia is the logical agency to perform this service if it will make itself active in this direction. There is actual need for study of legislation relating to the practice of orthodontia and other specialties. The American Board of Orthodontia as a subsidiary organization of the American Society of Orthodontists occupies the most strategical position to act as an advisory board on these matters.

A concerted and united effort should be made to eliminate charlatanry in orthodontia quackery as practiced by mail-order treatment laboratories. This is largely an educational problem and can be best accomplished by exposing the racket in official dental journals and in lectures before dental organizations. The sectional orthodontia societies, cooperating with the American Society of Orthodontists and the American Dental Association, can wield a powerful influence in persuading the publishers to cooperate with these organizations in their efforts to place the practice of orthodontia on a more ethical and professional basis. Amendments to and proper interpretation of existing laws should be made a more active and effective utility for controlling these evil methods of practice.

DISCUSSION

Dr. E. B. Arnold, Houston.—I am heartily in favor of the things Dr. Sorrels advocates, especially that dentists wishing to specialize in the practice of orthodontia should be required to spend at least a year in some recognized university offering such a course, said university being recommended and approved by the American Board of Orthodontia. We have all noticed the spectacular ads in the various dental journals in which dental laboratories offer to diagnose, make appliances, and outline treatment by mail. I do not understand why we cannot curb this type of misleading and, I might say, malicious advertising.

In regard to placing specialties under a state licensing system, as yet we in Texas have done nothing toward such a law; however we expect soon to organize a state orthodontia society, and I sincerely hope this body, when formed, will exert its efforts in obtaining such a law as Dr. Sorrels and other Oklahoma men hope to have passed in the state of Oklahoma.

Dr. Brooks Bell, Dallas.—The essayist has brought most forcefully to our attention the chaotic condition of orthodontic education and the resulting evils in orthodontia practice today.

I believe this chaos, the basis of which is the short course system of orthodontic education in both proprietary schools and private offices, has arisen from and continues to rise through failure of orthodontia instructors in dental schools to emphasize the importance of proper postgraduate orthodontic instruction. It seems to me that the nine-month postgraduate course is the proper one.

Since I have been head of the orthodontia department in the Baylor Dental School, it has been my policy to emphasize at the beginning of each year, to the sophomores, juniors, and seniors, that the course being offered is not to make orthodontia specialists of each graduate but to teach the fundamentals of orthodontia; that later if specialization is desired it will be necessary to take proper postgraduate instruction. Then through two years and a half I attempt to teach them the knowledge necessary, in my opinion, for them to be general practitioners of dentistry with a good understanding of orthodontia.

They are given the following course from the mid-semester of the year to the senior year: one semester of laboratory work; three semesters of lectures, beginning with the history of orthodontia, time of calcification, eruption, and absorption of the teeth, classification, etiology of malocclusion, orthodontic nomenclature, reaction of tissues to orthodontic treatment, child psychology, type of appliances and retainers; then during the last semester of the senior year they are given lantern slide lectures, showing the different types of cases—the ones they should not attempt to treat and why, and the ones they might attempt to treat and how. The last lecture again emphasizes that proper postgraduate instruction is necessary for specialization.

Although I have been criticized for teaching "too much orthodontia" and "turning out orthodontists," it seems to me that the only way to increase interest in orthodontia is to teach dental students the necessity for it. As long as the majority of dental practitioners consider orthodontic treatment necessary only to improve esthetics instead of improving dental health, orthodontia is at a standstill. Education of both undergraduates and graduates will impress upon them the necessity of proper orthodontic treatment by well-qualified or licensed specialists.

One evil which Dr. Sorrels did not mention is becoming most prevalent in our profession. I refer to the combination of specialties—prosthetics and orthodontia, periodontia and orthodontia, etc. The men practicing these specialties publicize themselves as prosthodontists, periodontists, orthodontists, etc. A licensing system as suggested by the Oklahoma State Society would force such practitioners into one specialty, allowing them to give their full energies to it and enabling them to become better specialists.

We are really going to have to unite against the commercialization of orthodontia by laboratories promoting diagnostic and treatment service by mail. Otherwise, the orthodontia organizations will have failed in their professional and public obligations to provide and maintain a proper standard of health service in orthodontia. The most practical procedure at this time is to enlist the cooperation of the publishers of dental journals carrying this kind of advertising material. Considerable progress is being made along this line, and the dental profession should be very grateful to both Drs. Harry and T. W. Sorrels for their leadership in an honest effort to develop a higher standard of orthodontia service.

The essayist mentions one way of combating laboratory orthodontia—by making the orthodontia specialist available for consultation without making the consultant feel that he is imposing upon him. I believe that we can bring ourselves closer to the general practitioners, make ourselves more available, as it were, by holding such meetings of the Southwestern Society of Orthodontists as delegated to Texas in conjunction with the Texas State Dental Society; the orthodontic meeting could be held Monday, Tuesday, and Wednesday before the state society's meeting is well under way, and thus enable the orthodontists to attend the state meetings more frequently.

Another method of combating laboratory orthodontia is to teach undergraduate students as well as the men already practicing how ridiculous are the claims made by these quack laboratories and urge the general men to consult us about their cases. When they consult me, I diagnose the case to the best of my ability and outline a treatment if I think the man can treat it satisfactorily; if the case is difficult I tell him so and advise him not to treat it.

The paper is worthy of our closest scrutiny, and I want to congratulate the Oklahoma orthodontists for starting a campaign of orthodontic regulations that is attracting national attention.

Dr. P. G. Spencer, Waco.—Dr. Sorrels has given considerable thought and effort to the preparation of this paper, and it presents worth-while suggestions for consideration and opens up a wide avenue for discussion. He partially answers the query often made: "Why should there be long courses when a majority of the practicing orthodontists secured their initial instruction in short-term courses or in established offices under recognized leaders?" I feel confident that the progress made in the practice of orthodontia has been mainly because of the type of men in the profession which overcame some of the handicaps incurred in the method of instruction, men who were enthusiastic over the possibilities of treatment and were frankly aware of and were honestly endeavoring to overcome failures. For a number of

years after Dr. Angle started his courses, orthodontia made little progress compared with present-day advances. It took some years to pass through the mystic stage and closed corporation of thought, but decided progress is being made as we realize how little we know. Education that throttles individual effort does not beget progress. About the only lasting value of any instruction, be it long or short, is semidirecting the course of study and definitely stimulating the desire to study. In a discussion of proper education one point of fundamental importance is often overlooked—the instructor.

I recall hearing the late Dr. Dewey say that he was not concerned with the method or place in which one gained knowledge—the main thing was to get it. All things being equal, one should obtain more in a long course of instruction; however, if the dental courses really included basic instruction in the orthodontic problem, with a purpose not only to produce more orthodontists, but also to make undergraduates really think individually and study the problem, then greater progress would occur. Our approach to a majority of the orthodontic problems has been from the wrong point—a correction of the anomalies after they occur. Ability to construct an appliance with perfect soldered joints does not make an orthodontist but does make a good technician. Regardless of long or short courses of instruction, unless the instructors are qualified and are able to implant in the student a desire for continued study of the subject, failure will result be it orthodontia, law, or whiffle fishing. Education is today becoming a matter of credits, with less regard to actual gain which will be of real value to the individual. Certainly some qualified organized group should supervise orthodontic instruction; but who has the right, or who would have the unified support, to assume the authority in a profession whose members provide the greatest handicap—intolerance? There have been several attempts of certain universities to promote and provide postgraduate courses of orthodontia. Probably 80 per cent or more of this instruction should have been as carefully and fully taught in the undergraduate dental course. Many of the dental schools are advising their prospective students that instruction is given in appliance construction and students are required to carry a selected case to completion during their senior year. The schedule shows that they have a very limited number of hours for this supposedly simple task. A properly conducted short course may provide more actual hours of instruction than a full nine-month course. The teaching of the subject of orthodontia is certainly being given more attention each year; but with few exceptions, depending upon the type and ability of the instructors, it falls far short of what it should be. The schools should not attempt to provide large orthodontic clinics but should have a few well-selected cases under the personal attention of a qualified instructor to demonstrate properly the fundamentals of the mechanical phase of treatment; then there would be a greater possibility of coordination with the schedule of lectures on this and other allied subjects. Dr. Sorrels very rightfully points out that every dentist has a perfect right to practice all phases of dentistry, and it is certainly a laudable suggestion that we assist the dentists with advice when we are called upon, but from personal experience it is a difficult and always a misguided effort. The dentist is not to blame, as the major portion of his undergraduate orthodontic instruction was memorizing the definition of orthodontia. Orthodontic instruction is in a very poor way today and is more or less on the spot. Short-term courses conducted solely for gain, or under the reputation obtained through former management, or long-term courses with a schedule of study designed to fill in the time, or private office instruction which often produces only orthodontic mechanics molded to follow a definite system, does not, nor will it ever, solve the problem or be a credit to this branch of dentistry. With this condition facing us, is it any wonder that we have reason to combat the orthodontic laboratories? Less mechanical instruction to the undergraduate and greater stress upon prevention of recognized contributing causes of malocclusion not only will do far greater good but also will prepare the profession to be able to recognize better the falsity and hokum of the claims of orthodontic laboratories.

Dr. W. E. Flesher, Oklahoma City.—Everything is evolving so rapidly during recent years and months, both inside and outside the profession, that I am compelled to revise my discussion of the essayist's paper just before it goes to press about four months after its delivery.

It so happens that I am chairman of the Legislative Committee of the Oklahoma State Dental Society, which is charged with the responsibility of completely revising the dental laws regulating the practice of dentistry in Oklahoma. Dr. Sorrels and I have from time to time in a casual way discussed the problems which he has presented, and merely wondered when and how they would be solved in a practical fashion. It never occurred to us that we would soon be called upon to answer them in the best way we knew how.

I am sure all readers will be interested to know that all the basic principles in the essayist's paper relating to legislation on qualification for specialized practice and control of commercial orthodontia laboratories have been made an integral part of the Oklahoma Dental Act. It has had the careful study and scrutiny of hundreds of dentists in Oklahoma and scores of leading minds in dentistry scattered over the United States. These legal provisions have had the full support of the profession.

The Oklahoma Dental Act is now before the legislature, and we feel confident it will be passed at an early date. The dentists of Oklahoma are, furthermore, of the opinion that this Dental Act is so modern that it will be copied, in whole or in part, by many state dental societies over the nation, whenever they desire new dental legislation.

I want to take this opportunity of expressing my appreciation for this analytical presentation and the courageous manner in which Dr. Sorrels deals with his convictions.

ETIOLOGY OF MALOCCLUSION*

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MALPOSITION of the teeth is only an indication of some force or forces operating inside or outside the mouth, which has or have caused the abnormality. The word "heredity" and its meaning is clear to every one, but with it we do not explain in the least the primary cause of an anomaly of dentition which shows itself in later years.

In order to determine the primary cause, we must ask first of all what forces have been at work to cause the normal position of the teeth. Then we shall find in the cavity of the mouth all those factors which give the tooth its proper place during the period of dentition.

1. The necessary space for the tooth is provided by the development of the tooth itself.

2. The growth of the jaw serves as a guarantee that the alveolus where the tooth is implanted will be sufficiently large and of the right shape.

3. The teeth in the opposite arch prevent the tooth from erupting too far.

4. The tongue, cheeks, and lips are responsible for the harmonious proportion and symmetrical form of the dental arches.

Being convinced that the growing tooth finds its natural limits in all directions, we can suppose that some special disharmony in dentition must result as soon as the limiting forces of nature fail anywhere in the mouth. It follows that want of space for the teeth will result from disturbances or interruptions in the growth of the jaw; also that abnormalities of form will show themselves in the maxillary dental arch of mouth-breathers, owing to the lack of pressure of the tongue. Third, we can imagine that the teeth of a "grinder" will fail to erupt to the normal length and be quite different from those of a defective masticator. Indeed, all these abnormalities of position can be attributed to the fact that the forces of nature were disturbed during the development of the teeth.

Let us sum up these displacing forces of nature as follows:

(1) Disturbances of the pressure of mastication.
(2) Disturbances of the pressure of structure.
(3) Disturbances of the pressure of air.

When first considering the disturbances caused by pressure of mastication, we shall find that excessive use of the teeth—for instance, grinding at night—results in a relatively broad dental arch with a shallow alveolus. This increased

*Read before the meeting of the European Orthodontological Society in Paris.

pressure of habit mastication may be on both sides or on one side only. In the latter case a defect in the symmetry of the dental arch ensues.

If the pressure of mastication is slight, we get a relatively small dental arch and a highly developed alveolus.

It must not be supposed, however, that with a small dental arch the space for the tongue is reduced in size or that with a broadened dental arch this space is enlarged; in both cases the normal space for the tongue remains unchanged, the only difference being that in the one case there is more room in the vertical and less room in the horizontal direction, in the other there is more room in the horizontal and less in the vertical direction.

The second important factor is disturbances of the pressure of tissue. Here we distinguish two main groups:

(1) Disturbances of accretion (growth).
(2) Disturbances of development.

If you have to treat disturbances of growth, you may be sure there are disturbances of the glands of internal secretion, which cause a heightened or lessened accretion. If there is heightened accretion of the jaws, as for instance in acromegaly, you get a set of teeth with gaps, which is the more noticeable because of the enlarged tongue. Reduced accretion, as for instance in dwarfism of the jaws, does not leave sufficient room for the teeth, so that they overlap each other and dental pulps may even be destroyed. Disturbances of the glands of internal secretion may be the cause in this case.

The disturbances of accretion mentioned above were caused by hormone disturbances of the functions; whereas disturbances of development (cytogenesis), which we shall now consider, result from a dysfunction of the circulation or the nerves. Thus, for instance with ankylosis, you will always find hypertrophy (malnutrition) of the jaw, and in connection with it, poor development and anomalous form, as well as abnormal dentition; with trophoneurotic disturbances, however, a one-sided underdevelopment or even superdevelopment of the jaws is to be found, for instance one-sided atrophy or hypertrophy of the jaws, and with it anomalies of dentition.

These conditions are ultimately the cause of an abnormal pressure on the structure, and we learn from this classification that disturbances of accretion and development must be considered important etiologic elements in the abnormal formation of the jaws and partly also in abnormal dentition.

Sometimes, later in life, secondary anomalies of dentition develop through accidents, extractions of teeth, loss of teeth, operations, or pressure of tumors; in these cases a normal dentition is often changed into an abnormal one, contrary to the cases described above.

Secondary anomalies of dentition are thousandfold. Almost all are to be found in the mouths of elderly persons. Here, too, the cause is the disturbance of the functions of the pressure of mastication, tissue, or air.

With regard to the latter, it may be said that disturbances of the normal pressure of air in the mouth, especially during eruption, are very common and lead to a great number of the well-known anomalies of dentition. The normal

atmospheric pressure is effective only with one who really breathes through the nose. In this case the mandible is held firmly to the maxilla like a set of teeth to the suction disc. The weight of the mandible forms, at the highest point of the palate, the so-called "Donder's suction space," in the same way as the suction chamber in the suction plate.

If this adhesion of the mandible is properly accomplished, the tongue, lips, and cheeks hold the teeth firmly and at the same time prevent them from deviating from their right course, toward either the outer or the inner side during eruption.

As a matter of fact, fewer anomalies of dentition are found in nose-breathers than in mouth-breathers, for with the latter the tongue lies in the mandible, and the lips and cheeks likewise have an abnormal position. Consequently the maxillary dental arch shows too small a development, and a distoclusion usually arises. In addition to distoclusion, an open-bite very often develops, which may be partly attributed to the child's habit of putting its tongue between its teeth.

When judging a habit we must realize that after all it takes its origin in the brain, that a certain predisposition exists, and that every habit produces a disturbance of the normal pressure of the tissue. It is the same whether the habit is sucking the fingers or biting the lips, cheeks, or tongue. In any case, an abnormal pressure is exerted on the erupting teeth and therefore also on the tissue surrounding the tooth (secondary pressure of the tissue).

In summing up, we may therefore say that all malocclusions, as far as disturbances in the construction of the teeth or changes of the dental arch are concerned, have their origin in disturbances of function, of the pressure of mastication, muscular pressure, and atmospheric pressure.

The result of this research shows that there are only three causes which produce malocclusion, provided that there are no deformities.

And so we come to the sphere of teratology. As a cause of malocclusions we must consider:

(1) Deformities of the jaws.
(2) Deformities of the follicle wall.
(3) Deformities of the teeth.

It is quite clear that any deformity whatever of the jaws, deficiency or excess, makes normal dentition practically impossible. Deficiency of the dental lamina, such as lack of teeth, or excess of it, such as a surplus of teeth, likewise hinders normal dentition, as do always giant teeth, dwarf teeth, and composite teeth. Accordingly, I invite discussion upon this new etiologic line of research, which has only been outlined.

The new system of etiology of the anomalies of the teeth runs as follows. Anomalies of the position of the teeth are the consequence of:

(1) Teratologic causes.
  (*a*) Deformities of the jaws.
  (*b*) Deformities of the dental lamina.
  (*c*) Deformities of the teeth.

(2) Functional causes.

(*a*) Functional disturbances of the pressure of mastication.
(b) Functional disturbances of muscular pressure.
(*c*) Functional disturbances of the atmospheric pressure.

Included, of course, are all the irregularities resulting from heredity, all such habits as exogenous disturbances of the pressure of the tissues, all deformities of the skull as being connected with deformities of the jaws.

I intend to write a specific commentary in the form of an enlarged treatise on this subject. Here I have only discussed a general line of thought.

THE BIOLOGIC PHASE OF ORTHODONTIA*

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ACCORDING to the Standard Dictionary, a thesis is a proposition advanced affirmatively or negatively to be maintained or defended by argument, or it can be an essay or treatise on a particular subject. When one is asked to write such a thesis on the biologic phase of orthodontia, if he has been in practice for some time and has had the opportunity of seeing his particular ability and skill bring about all kinds of results, good, bad and indifferent, he will be forcibly impressed with the fact that it would be easier to write about things of which he is ignorant than to impart any information which has not already been set down by a number of much more competent men. Why not make this thesis a sort of confessional, setting down herein those things about which I should like to learn? I shall confess my ignorance on these three subjects: etiology, tooth movement, and relapses; and I am afraid that just about covers the subject of the biologic phase of orthodontia. My study of orthodontic literature may not be as complete as it should be, but it is extensive enough to have learned this. The specialty of orthodontia has progressed to the extent that it is serving as a definite but slight benefit to mankind. Helpful information is constantly being added to our fund of knowledge. But, of course, as long as we must continue to treat cases mechanically, it being our only means of attack at the present time, the amount of good we can do will be infinitesimal. The true solution will come when malocclusion can be prevented, and not treated.

Even in the cases which we do treat, we are not infallible, and should not be led astray by our successes. I am firmly convinced that I have treated certain cases which never should have been touched. How I wish that I could definitely and correctly say, "This case should not be treated," or "This case should not be treated now." Granted I do make these statements about individual cases, but are they always correct? Why is there such a variation in the success of my final results? Several years ago we did not hear much about failures. Perhaps every one had the feeling that he was the only one who had them, and therefore it would be better to keep it a secret. But now we all are admitting failures. I shall always remember the feeling of relief that passed over me several years ago when a prominent orthodontist remarked at a meeting, "About 50 per cent of my cases are successes, and by successes, I mean no worse when I finish than when I started." Of course it was a facetious statement, but at the same time it was an honest confession that all results were not ideal. It has been said that the publication of failures is liable to encourage a lack of effort, and to create a feeling that a case is good enough when it really can be improved. I cannot agree with this contention. We can be inspired to maximum effort by the fine

*Presented to the American Board of Orthodontia, May, 1932.

results of others, but we can learn more of our limitations by a comparison of our failures.

In making any attempt to differentiate in advance of treatment those cases which will have good results from those which will not, we of course immediately get into etiology, and here at times I get exceedingly hazy. The causes of malocclusion have been enumerated many times. In Dr. McCoy's last edition of *Practical Orthodontia* he has made a clear and concise tabulation of the predisposing and exciting causes. A most comprehensive paper by H. H. Berry entitled "Our Present Knowledge Regarding the Etiology of Malocclusions" sums up quite well just about what the title states. There have been other papers published recently which have called attention to the importance of establishing the etiology of a case before attempting treatment. It has been claimed that we are too eager to apply mechanical force, and slipshod in our diagnosis. Probably this is true. Dr. McCoy has listed seven predisposing causes and fifteen determining causes of malocclusion (Table I).

TABLE I

MALOCCLUDING TEETH AND ATTENDING DEFORMATIONS

Predisposing Causes	Unknown causes
	Endocrine unbalance
	Metabolic disturbances
	Acute or chronic infectious and deficiency diseases
	Prenatal abnormalities
	Congenital defects
	Heredity
Determining Causes	Missing teeth
	Supernumerary teeth
	Transposed teeth
	Malformed teeth
	Abnormal frenum labium
	Intrauterine pressure
	Pressure, sleeping habits, posture
	Pressure, abnormal muscular habits.
	Premature shedding of deciduous teeth
	Tardy eruption of permanent teeth
	Prolonged retention of deciduous teeth
	Premature loss of deciduous teeth
	Loss of permanent teeth
	Improper dental restorations

It is a comprehensive and imposing list, but when I take the average case that comes to my office, and try to diagnose its etiology, it often falls under the first heading of the predisposing causes, "unknown."

Just from the general observations which I have made and which are so limited that they have no scientific value, it seems to me that a large percentage of malocclusion is due to some intrinsic condition of which we know very little. One might say that this large percentage is due to a lack of development of the deciduous dentitions; but this is of course no cause at all, as the real cause is the one back of that. Is it lack of function? Is it faulty diet? Probably some of both, with improper function playing the leading rôle. It would seem as if

we could attribute many of these undeveloped deciduous arches to this cause. Certainly the teeth of the children of today are not being used as they were intended. There is practically nothing in the diet that calls for vigorous mastication. The theory has been advanced that these arches need the stimulation of strenuous chewing in order to develop. But I understand, some Eskimo children are breast fed until they are several years old, and at the same time acquire large developmental spaces between their deciduous teeth. Perhaps they chew on inedible substances, just for exercise, as a dog does. A puppy will chew anything and everything he can get hold of. Some children do the same thing. Perhaps it makes up for a lack of tough foods in the diet. My perplexity along these lines has been increased by observing my own son, aged four and a half years, and his first cousin who is four months older. Neither of them has any articles in his diet, outside of one portion of meat, once a day, which requires much chewing. The older boy is probably a little sturdier than the younger. But the younger one has developmental spaces between every deciduous tooth, and the older one has none. Both have normal mesiodistal relations. Is there or is there not a hereditary factor? On this subject alone there is a great difference of opinion. We have alternately veered away from and returned to this great influence as a cause of malocclusion. Those who believe it is not an important factor claim that the men who do accept it are confusing the terms "congenital" and "hereditary." The fact that similar types of malocclusion occur in certain families is attributed to similar environment and not to inheritance. It is pointed out that similar cases are occurring all the time in unrelated families. What stronger proof is necessary than the fact that a classification of these various types of deformities can be set up? Heredity had nothing to do with it. This sounds logical, and when stated by an authority has a convincing ring. But when I examine individual conditions, which every really scientific man knows are no criteria, I waver.

The late Dr. Dewey in the fourth revised edition of his textbook, in a chapter on heredity as a cause of malocclusion said: "Any variation that is not impressed upon the germ cell will not be transmitted. Each individual germ cell possesses a certain amount of chromatin that presides over inheritance. In order that a child may inherit malocclusion, the malocclusion must be impressed upon the chromatin of the germ cell. We have no evidence that such a thing can occur. After the union of the male and female pronucleus, the embryo develops as a separate organism in which is contained the sum total of all the characteristics carried by the male and female germ cell. The offspring may resemble one or the other of the parents, or may be a blending of the two; if a blending of the two, the offspring will not exactly resemble either parent. The author does not feel that any other condition can occur, as no other conditions except those above mentioned can be found anywhere in biology. On the other hand, those who advocate the inheritance of malocclusion, and a certain number of men do, maintain that certain types of malocclusion are transmitted." But in a previous chapter on general or constitutional causes he said: "Therefore, a great many constitutional conditions that would affect the general metabolism of the individual may be the result of unhealthy germ cells or rather are produced by the union of germ cells that are below par. As a result of this we

may say that certain types of malocclusion or certain constitutional conditions that will influence malocclusion have their beginning with the union of the germ cells. In other words, we would not expect a child who was the result of the union of two germ cells that were below par to develop in the same physical manner as a child who was the result of a union of healthy germ cells. Therefore, the child from the germ cells that are below par will develop all manner of physical ailments and show abnormal and retarded development in every respect, and of course among these will be the maldevelopment of his teeth and their supporting structures." Now these two statements bring the two opposing factions, that is, those who believe in heredity as a cause of malocclusion and those who do not, more or less into agreement. The very production by the parent of a germ cell below par may be an inherited tendency. The actual malocclusion per se has not been passed directly from parent to offspring, but what may have happened is that certain predisposing causes have been inherited by the child which finally produce the same type of malocclusion as exists in the parent. This statement I feel is often true of distoclusion, but is particularly applicable to cases of mandibular prognathism. In my practice this type of case forms a rather small percentage, not over one per cent. That indicates that this type of malocclusion occurs rarely, as compared with other types. If this is true, according to the law of averages, it certainly ought not to be found in two members of one family. But just the reverse is true, at least in my experience. Almost always, one of the parents or some other progenitor has a similar condition. Another cause of malocclusion that seems to run in families and certainly can be laid to no other cause than heredity is missing teeth. It would seem as if odd positions or certain peculiar rotations of individual teeth can also be passed directly from parent to offspring. As an example of this (I realize that single examples prove nothing), I have had just one patient in whose case the mandibular canine and lateral incisor were transposed. When I told the father that this condition was rather rare, he pulled down his lower lip and showed me exactly the same condition in his own mouth. It may be coincidence, but it is pretty far fetched.

Dr. Stallard has published some interesting statistics which show that dolichocephaly is liable to accompany distoclusion. All the families which I have examined who have distoclusion as a "family trait" have been of the dolichocephalic type. He does not claim that dolichocephaly is the cause of the distoclusion, but apparently believes that it is a contributing factor in certain cases. He also states that in an examination of almost 7,000 children of school and preschool age, 50 per cent of the children acquired malocclusion between the ages of birth and two years. Quoting from his paper he says in regard to the significance of this early manifestation of malocclusion: "This is significant, for it tends to discredit many of the former theories of etiology, namely, mouth-breathing, lack of use in chewing, perverted cusp and axial relations. This large percentage of malocclusion is imposed upon the children during their most tender age, before they have become or should become vigorous eaters. About 50 per cent of the children having malocclusion in the first group have distal occlusion, which is so often attributed to mouth-breathing. How greatly perverted breathing would need to be to develop this kind of malocclusion in the

first two years of life is beyond reasonable comprehension. In many babies the face and jaws are noticeably narrowed symmetrically before any teeth erupt—before the mouth assumes the chewing function.'' Dr. Samuel Goldberg examined 50 pairs of identical twins, 42 pairs of which had been previously examined. He found that 24 per cent bore good evidence of reversal but that this reversal did not always hit all the characters, although it was likely to hit the majority. Of the 50 pairs, 42 of them had malocclusion. He diagnosed 10 of these as being due to extrinsic causes and 32 of them apparently intrinsic. His conclusion was as follows: ''That all the extrinsic forces of the malocclusion are insignificant compared with the intrinsic factors. Unless any given case of malocclusion is obviously due to some extrinsic factor, there is no justification from the statistical records available to anticipate lasting success. It is not merely a matter of bringing the teeth into alignment and occlusion; the question is, to what extent is equilibrium between the teeth and bony support permanently established in the new position?''

But nothing can be proved along these lines, without a great deal of well-tabulated information, and so I shall leave the subject with a quotation from Dr. McCoy's last edition of *Applied Orthodontia:* ''So for the present, at least, it would seem as if heredity occupies rather a negligible position among the numerous factors which are operative in the production of malocclusion. In reaching such a conclusion, however, we should not assume too arbitrary an attitude, but remember that this great subject (heredity) is still an open one and some day we may know 'all the story,' only a part of which is in our possession at present.'' With the second sentence I am in perfect accord, but I cannot quite agree with the first one.

Having gone into my ignorance on the subject of etiology at some length, I shall pass to further confessions about tooth movement. Having read about the experiments of Oppenheim on the subject, which seem to explain the process in a logical manner, I have felt justified in placing appliances, inasmuch as I had some idea as to just what changes those appliances would produce. But more experiments are being done along these lines. At the March, 1932, meeting of the New York Society of Orthodontists, Dr. Boedecker partially reviewed the work of Gottlieb and Orban. I heard this review, and one of the most disconcerting statements was that this newer work of these two men does not substantiate Dr. Oppenheim's findings. Dr. John Marshall has issued a summary of his work, in which he states that the findings of Oppenheim on tooth movement are of little value because Oppenheim used the deciduous teeth of monkeys to obtain his evidence. He also can find little information of value to us in the work of Gottlieb, as he used dogs as experimental animals, and the pressures applied were so extreme that they could not be compared with the pressures exerted by orthodontic appliances. Dr. Marshall's own conclusion is that additional work must be done in which the force applied has been definitely measured. Then only will we have accurate histopathologic data. In this field, we must still fall back on our empirical findings in our clinical work until this further scientific investigation is completed.

Nowadays, when we speak of tooth movement at all, if we are referring to movements accomplished by a mechanical appliance, we must say physiologic

tooth movement, or we may be branded as a mechanic. Applying the term does not, however, change the act. I believe, generally speaking, when we say "physiologic tooth movement," we mean slow movement with gentle pressure, and when we say "tooth movement," we mean any kind. This is not intended as a criticism. I use the term, but not because I know what it means.

Apropos of this subject, our specialty seems to be somewhat divided, and the dividing factor is the type of appliance used. Some use root moving appliances and some use light spring appliances, and these two factions still have heated arguments as to the relative merits of their appliances. Of course, many of us are using both types. I believe that orthodontists as a whole are gradually swinging around to the simple appliances with which they accomplish as much as they can, and then if it still seems necessary, teeth are banded and "root moving" appliances placed. Dr. Mershon is to be given the credit for developing the light spring appliances. He developed the lingual arch with light auxiliary springs in order to have an appliance which would fit in with his conception of the orthodontic problem. He has stated that problem as follows: "Malocclusion is the result of functional disturbance in bone development and all associated tissues, plus heredity. The orthodontic problem is not a tooth problem. It is a growth problem, and the machinery involved in growth with all its complexities is the phenomenon which induces a tooth to change its position, the appliance being only an aid in so far as it produces a stimulus." Viewed wholly from a mechanical standpoint, the lingual arch with auxiliary springs is probably not so efficient as some of the other appliances. The application of force is well above the centers of gravity of the teeth. If the teeth were blocks set in plastic material, nothing but tipping movements could be accomplished by such an appliance. But teeth are not set in an inert substance, but in living growing bone, and therein lies the value of the lingual arch with auxiliary springs, for a constant mild stimulus can be exerted on this bone, and yet the teeth are not bound in such a manner as to interfere with coincidental natural growth. The logic of this method of approach appeals to me. It produces slow tooth movement, which seems advisable, and the appliance is simple and easily kept clean. Nevertheless, it cannot be denied that men who are using more rigid types of appliances are obtaining some fine results. As for the speed at which teeth can safely be moved, as I said before, slow movement and gradual development of the arches, keeping abreast of the rest of the development of the child, seem reasonable to me and in my practice produce the best results. How fast can an individual tooth be moved? Nature herself sometimes accomplishes very rapid movements. One of my case reports shows a case in which the maxillary canine is squeezed out of the arch. In this case, for reasons given in the report, the first premolar was removed and the canine allowed to drop down into its place. The speed with which this movement occurred naturally, was greater than I would ever dare to move a tooth by means of appliances. In other cases which I have been able to observe, in which extractions have been done but no appliances placed, the speed with which the teeth adjacent to the space approximated is often astounding. As can be seen from the foregoing I have much to learn about tooth movement.

I have confessed my ignorance about etiology and tooth movement. Now

comes the greatest confession of all, and the one which has caused the greatest amount of personal anguish and embarrassment. It is the problem of relapses after treatment. When I have obtained a fair occlusion with the teeth in their proper axial relations, why do they relapse, not always to their original relations, but sometimes to entirely different positions of malocclusion? If I should ask this question in a meeting, I can hear a chorus of answers.

Improper cusp relations, says one. Wrong diagnosis of necessary movements at the start of the case, says another. Function has not been established. The surrounding and adjacent muscles had formed abnormal habits and have not been properly trained to accommodate the new form of the dental apparatus. The apical base is deficient, and the arches have no support. Relapse was inevitable. (On this last contention Dr. Lundström has written a logical and scholarly paper.) Perhaps these and a half dozen more have been true of some of my relapses. They all can be summed up in two expressive sentences of Dr. Mershon. "You can push teeth to where you think they belong. Nature will move them to where they will best adapt themselves to the rest of the organism." The most outstanding method advanced today as a secondary treatment to hold the results obtained is muscle training. A mouth-breather should be taught to breathe through his nose. Loose buccinator and labial muscles must be toned up. The individual must be taught to chew. These things will undoubtedly aid in those cases in which faulty muscular action has been concerned in producing the malocclusion, but they are not going to control some of those other intrinsic forces, of which I, for one, know nothing. All the forces and all the influences surrounding the denture must be in harmony for the teeth to remain in position. There is the hitch. In some of them I did not know what produced the malocclusion in the first place, so why should I know what causes the relapse?

It has been said that honest confessions are good for the soul. I ought to feel better. I have tried to enumerate a few of the things which are troubling me. From reading the preceding one might easily think that my successes are outnumbered by my failures. I believe I can honestly say that this is not the case. I have written in this vein because I am much more depressed by one failure or partial failure than I am elated by a success. I should certainly be misunderstood if this paper is construed as a criticism of the research done and the investigations carried on by the leaders of our field. We probably are advancing faster than the average specialty of dentistry or medicine. All things must have their beginnings, and the science of orthodontia is just begun. These dark intrinsic forces, which some of us so strongly suspect as being the cause of a large percentage of malocclusion, may be a myth. Lack of function and faulty diet may be the big unknowns after all. If that is true, proper education can control them, and malocclusion will be prevented rather than treated. I fervently hope this to be the case.

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THE CRISIS IN ORTHODONTIA*

PART I

3. CRITICAL REVIEW OF THE PUBLICATIONS ON ORTHODONTIA BY B. GOTTLIEB, B. ORBAN, A. M. SCHWARZ, AND J. A. MARSHALL†

ALBIN OPPENHEIM, VIENNA, AUSTRIA

(Continued from page 156, February)

(2) For the theoretic postulate for "biology" and disregard of this postulation in practice, a few samples may be cited.

On the one hand, Schwarz maintains that "the forces resulting from swelling of silk, wood, or rubber wedges are not measurable and are usually *far too strong*"; on the other hand, he advocates in his casuistic contributions and in Scheff (Vol. 6) the use of silk to perform quite extensive tooth movements, although I have called attention to the possibility of producing root resorption, particularly by using silk (Ztschr. f. Stomatol. p. 614, 1929).

Schwarz recommends on several occasions the use of bite-caps and states: "In the practice of orthodontia bite-caps, analogous to the caps used in the experiments of Gottlieb and Orban, are often used. Attention should be called to the various forms of inclined planes, to the functional overstress brought about by masticatory exercises, and to other orthodontic procedures, which cannot be omitted from modern orthodontic therapy." Twelve pages farther on he describes the destructive results of these caps "that are quite analogous to those used by Gottlieb and Orban: In using strong forces, which crush the tissue, the tissues which are deprived of their vitality are eliminated by intense resorption of the peripheral tissues which have not lost their vitality, in order to permit further movement of the tooth."

Should not the postulate for biologic treatment be applied to all tooth movements, therefore, also for the shortening of teeth? Should not the postulated 20 gm. maximum pressure (Schwarz) also be valid for the shortening? Are the strongest intermittent forces of mastication permissible just here? Are not the manifold damages, ascertained by animal experiments, sufficient warning?

Also the "*springs for distal movement*" are recommended by Schwarz because of their "rational working." In his already mentioned casuistic contribution and in Scheff (Vol. 6) he makes a report on several cases of distal movement of molars by using this spring. For this purpose all deciduous teeth, and also as many of the permanent teeth as are present anterior to the

*From the Department of Orthodontia of the Dental Institute of the University of Vienna.

†Translated in abbreviated form from *Ztschr. f. Stomat.* Supplement to No. 22, November, 1933, published by Urban & Schwarzenberg, Vienna and Berlin.

tooth to be moved, are united into a "block resistance"; however, on account of the resorption of the roots of the deciduous teeth, on the one hand, and on account of the not yet fully developed roots of the permanent teeth, on the other, this resistance cannot be rated very high. Then the tooth that has been moved distally is stabilized in any suitable way (by union with a posterior tooth or by support of the anterior teeth) and is now used to move the posterior teeth distally. Schwarz points out "the reliable efficacy and the great help of this simple appliance in the performance of this distal movement which heretofore could often be performed only by resorting to the monstrous appliances of external anchorage by means of headgear and traction bar."

Schwarz quotes the findings of Breitner in the treatment of Class II with intermaxillary elastics, using en bloc anchorage in both jaws, and states (Fortschr. d. Orthodontik. **2**: 15, 17, 1932; Scheff, Vol. 6, p. 441): "Changes in the alveolar bone in the area of the teeth united by en bloc anchorage are

Fig. 12.—Complete transformation of the interalveolar bone septum by intermaxillary elastics, using en bloc anchorage to avoid as far as possible individual tooth movement (Breitner). *A*, Newly formed bone spicules arranged in the direction of pull; *B*, bone resorption on the opposite side of the bone septum.

found in the maxilla as well as in the mandible. These changes are resorption of bone on the side of pressure and apposition on the side of pull, both to such an extent that the original septa in the mandible were entirely replaced by new bone formed during the movement; even if we choose the strongest anchorage it is impossible to avoid individual tooth movement."*

Thus Schwarz quotes Breitner and shows a septum between the molars used for anchorage which illustrates the characteristic and complete transformation (Fig. 12). In practice this striking condition is entirely ignored by Schwarz; he recommends a method that will produce the described bone transformation within the septums and then a complete reversal of these changes during the reversed movement; and this the more as (1) the molars offer the greatest resistance to a distal movement and (2) because the resistance of the anchor teeth on account of the described root conditions and

*This statement was already made by Grünberg (Angle, *Malocclusion of the Teeth*, 1913, p. 663, 2nd German edition); it is given here as an original discovery.

the often present, reduced number is unquestionably weakened to a great extent.

A method which at one time forces and moves the teeth mesially and immediately afterward distally cannot, as far as the ultimate result is concerned, be considered in any way superior to a method sometimes using "monstrous appliances" but having the advantage of always working in *one* direction and therefore not disturbing the bone transformation once it has started* (INTERNAT. J. ORTH. **20**: 250, 1934). What results can be achieved with the monstrous appliances of external anchorage, and how "rational," on the other hand, the "spring for distal movement" works, have already been illustrated in the chapter on retention (INTERNAT. J. ORTH. **20**: 764, 1934, Fig. 26) and in the casuistic contribution to the first chapter (INTERNAT. J. ORTH. **20**: 334, 462, 1934, Figs. 1-24).

I have already criticized the "spring for distal movement" as an unphysiologic procedure on the basis of histologic material found in literature and of my own clinical observations (INTERNAT. J. ORTH. **20**: 334, 462, 1934).

Similar doubts are expressed by Korkhaus, Winkler, and Simon. In view of such weighty arguments, we have only intermaxillary elastics at our disposal to move posterior teeth distally. These elastics, however, often influence the mandibular teeth mesially to a greater extent than they do the maxillary teeth distally, since mesial movement of the mandibular teeth is always more easily performed than the distal movement of the maxillary teeth; thus instead of obtaining a distal movement in the maxilla which is desired, a mesial movement in the mandible is the undesired result.

(3) Recently Schwarz has recommended jumping the bite for the treatment of Class II cases, with the idea of "creating simple and inexpensive appliances for early treatment, particularly in dentistry for school children" (Scheff's Handbuch, Vol. 6, p. 474). One should expect that especially for treatment in school dental clinics only such methods should be recommended which give at least something comparable to a *permanent* result. This is, however, not true of the methods based upon jumping the bite.

With the investigations of Häupl and of Gottlieb and Orban, we are familiar with the tissue damages produced by cementing caps upon teeth and by raising the bite on individual teeth. Moreover, we do not know anything about the possible damages done to the permanent tooth germs when deciduous teeth are overloaded; yet Schwarz recommends the jumping method "as a treatment that is justified from the biologic point of view and that should be carried out by means of appliances attached wherever possible to the deciduous teeth only."

The Angle School has always discredited the jumping method because of the experience that after the removal of the appliances the patients present a *double occlusion:* the teeth can occlude in distal occlusion but also, by pro-

*My newest material from human teeth shows that there are *always* root resorptions of greater or less extent, even with the application of the most gentle intermittent force, not to speak of continuous force. In using the method just described, we would, therefore, find root resorptions on the mesial and distal surfaces of the root as well as on the root surfaces facing the intraradicular septum. The damages of the cemetum would then be distributed on the entire root surface.

trusion of the mandible, in normal occlusion. The patients have developed a *habitual luxation.* Such cases offer the greatest difficulties in later treatment, because even the weakest intermaxillary elastics cause the mandible to slip forward. In order to prevent this forward slipping and to make the elastics efficacious for a better development of the mandible (wherever this was indicated), Grünberg suggested a little device to be cemented on the last maxillary molar; this device leaned against the ramus and prevented

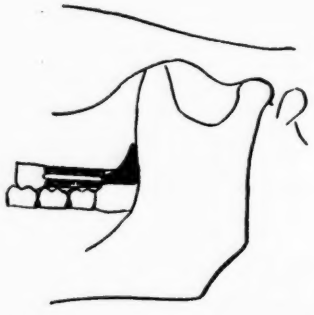

Fig. 13.—Device suggested by Grünberg for the treatment of Class II cases affected with habitual luxation, to avoid forward sliding of the mandible. (From Kantorowicz, *Klin. Zahnheilk.*

Fig. 14.—Device suggested by Grünberg for en bloc movement of the maxillary teeth in Class III cases, especially in advanced age, and for the en bloc movement of the mandibular arch in Class II cases with habitual luxation. (Oppenheim.)

the mandible from slipping forward under the influence of the intermaxillary rubbers. The appliance is shown in Fig. 13. In Class II cases with habitual luxation, I often attained the same result by using chin caps (the same type that is used in the treatment of Class III cases, except that the elastics of the chin cap were substituted by inelastic bands, which had only to secure the position of the cap).

Making use of one of Grünberg's ideas, I soldered to the chin cap two square, vertical tubes, into which fitted square wires, 2 mm. thick and of a very hard material (nikelin) corresponding in distance and height to the corners of the mouth (Fig. 14). Elastics were attached to hooks on the molar bands of the en bloc mandibular appliance and to grooves on the upper end of these vertical wires. This extraoral appliance was always worn during the night and also as much as possible during the day. Thus a mesial movement of the alveolar process of the mandible could be performed without influencing the maxillary teeth.

(To be continued.)

BUILDING EFFICIENT MASTICATORY MACHINES*

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RECENT dental and orthodontic literature contains many varied and contrary viewpoints regarding the development and growth of teeth and supporting bony structures, and the reaction to various types and methods of treatment at different ages, so that the student is in danger of becoming confused and bewildered in endeavoring to determine a safe and effective method of procedure. It will, however, doubtless be admitted by all that any measures which will tend to prevent malocclusion should be used whenever possible.

From surveys made in many localities it has been found that from 25 to 75 per cent of children are suffering from malformations of sufficient extent to affect seriously their physical and mental well-being. It is obvious therefore that it is practically impossible for more than a small percentage of these to receive adequate orthodontic treatment. Moreover, it is unsound in principle to endeavor to correct or eradicate conditions if it is at all possible to prevent them. It must be admitted that it is possible to prevent a great percentage of these malocclusions, and to keep most of them from progressing as far as they would go if left alone. To this end it is the intention in this paper to outline the possible measures which may be used for such prevention, including treatment of cases in their incipient, or early, stages.

HEREDITARY FACTORS

Heredity doubtless plays an important rôle in predetermining malocclusions or tendencies toward such malocclusions. In a previous paper I have gathered together the findings of a considerable number of investigators on this subject. I have there pointed out the many different opinions held by various authors and have emphasized some of the commonly accepted theories. Perhaps all that can be done in preventing malocclusion from the standpoint of heredity is to advocate a further study and practice of eugenics, and to urge the further study of hereditary causes of malocclusion on dentists and orthodontists that they will not attempt the impossible but will do all possible to prevent malocclusions caused by known hereditary influences.

Just as the expectant mother is advised as to the proper measures to take in order to assure her own health as well as to give the unborn child the best possible start in life, so also should this advice be given from the standpoint of assuring a normal masticatory machine. To this end it is doubtless true that the correct diet and exercises and rest which will bring about the former will also tend toward the latter. Any advice given at prenatal clinics, by physicians or pediatricians, which will improve the health of the expectant mother and assist in the normal development of the fetus will be a distinct aid in preventing future malocclusions in the unborn child.

*Presented to the American Board of Orthodontia.

DIET AND ACCESSORY FOOD FACTORS

The question of proper diet carries over from the pregnant woman to the nursing mother. Equally important is it for the latter, as for the former, to partake of those food essentials which particularly aid normal growth and development. Calcium metabolism alone is a sufficiently intricate subject to have occupied many researchers for long periods, and still there is much to be learned. Sufficient is known, however, that definite instructions to the nursing mother will, in most cases, provide mother's milk of the necessary requirements for that normal general and dental development so essential to prevent future possible malocclusions. A reference to the many standard writers on diet is recommended.[3, 4, 9, 10, 14] Likewise also, the proper advice as to diet of the child after weaning is equally necessary. Nevertheless, however admirable as to proper balance the average pediatrician's diet chart may be, my experience is that most of these are sadly lacking in food that necessitates the full use of the muscles of mastication. This is one factor in diet that the orthodontist should emphasize upon every occasion presented, not only to parents, but more particularly should it be brought to the attention of the pediatrician and the family physician and to all other sources of advice to mothers, such as welfare clinics, school and home nurses, and like individuals and groups, whose advice greatly influences the feeding habits of the young.

The importance of accessory food factors should be emphasized here. Many of these have proved of great assistance in building sturdy bodies. Calcium metabolism has already been mentioned. Cod liver oil and its derivatives have long been accepted as a sunshine substitute. Many others are not so widely approved but will gradually prove their worth. The conscientious orthodontist will cooperate with the physician in using these and other aids which will assist in bringing about the desired normal conditions. The marked benefits of outdoor life, exposure to the direct rays of the sun and the use of ultraviolet and arc lamps have been emphasized of late years. Agencies of these types doubtless contribute greatly to growth and development.

DEVELOPMENT BY EXERCISE AND IMPORTANCE OF FUNCTION

This problem of diet is closely linked with muscular development on which the normal growth of the masticatory machine depends greatly. In view of the great bulk of soft food it is perhaps desirable to use supplemental aids. It is universally accepted that normal development of bone depends on the use of the muscles attached thereto as much as to nutrition, that, in fact, the one stimulates the other. Various exercises recommended by Dr. A. P. Rogers[15] of Boston, Dr. H. A. Pullen of Buffalo,[13] and others, may well be used in a moderate degree from early childhood to aid in normal muscular and bone development, and thus to prevent malocclusion. Other aids may be suggested, such as chewing hard gum, objected to by some, yet probably of considerable aid in many cases; another method is the using of bite blocks of rubber or other materials, several types of which have been suggested and used by different orthodontists: among them one of linen designed by Dr.

A. P. Rogers of Boston, and two of rubber, one used by Dr. H. G. Bean of Toronto and the other by Dr. V. Fisk of Toronto. In fine, anything which will aid in bringing about normal function without creating bad habits is to be recommended. If one method does not bring about the desired results because of physical, mental or other factors, let others be tried. Let us recognize the fact that prevention at almost any cost is preferable to allowing serious malformations which can seldom be wholly corrected. Indeed, for the great majority treatment will never be attempted. It is perhaps unnecessary to say that bad habits, either muscular or any other type, are best overcome by substituting and emphasizing good habits to replace them.

REGULAR LIVING HABITS

Another important factor in building an efficient masticatory machine is regularity of life, especially desirable for children though advisable for all individuals. This would include sufficient restful sleep, proper nourishment and exercise, both physical and mental, which will best bring about the full all-round development of the child. It may be stated that interest in life is a necessary part of such development. This is being injected into educational and recreational pursuits as never before in the history of the world and should bear much fruit in assisting normal growth.

GENERAL AND ORAL HYGIENE

Part of this regularity of life, indeed growing out of it, is attention to personal hygiene and more particularly oral hygiene. It is obvious that just as bodily health is impossible without intelligent training in bodily cleanliness and correct clothing, so also regular and thorough attention to the oral tissues is necessary in assuring mouth health.[5, 7, 9]

Intelligent, thorough and regular use of the toothbrush by every individual should be the aim. Of the many methods advocated probably the best is that of forcing the bristles between the teeth by definite pressure and using a so-called "jiggling" movement of the brush while grasping it firmly in the fingers and placing the thumb directly back of the bristles. Dr. Elliott of Detroit is among the strong advocates of this method and claims there is little or no requirement for prophylaxis if it is thoroughly practiced. He also reports marked improvement in many cases of even severe cases of gingivitis using no other treatment.

DETECTING AND CORRECTING ABNORMAL HABITS

Added to the necessity for oral hygiene is the equal necessity for watching the individual for abnormal habits, the formation of which tends toward irregularities of occlusion. These are too well known to require elucidation at this time. They include faulty sleeping, breathing, and muscular habits. As in all abnormalities the cause must be removed and careful sympathetic efforts made to correct the bad habits, remembering that positive rather than negative suggestion is essential to success in most cases. The reader is referred to standard works on child psychology and allied subjects.[2, 3, 17]

ADEQUATE CARE BY THE DENTIST

Equally important is regular dental care. Not only should the dentist watch for and fill the smallest carious cavities, but he should prevent them whenever possible by thorough and frequent prophylaxis, filling of fissures with cement, and all other well recognized means which will go far in preventing malocclusions, gingivitis, and other lesions of the soft oral tissues which are by no means uncommon even in young children. If allowed to become chronic the inevitable reaction will seriously affect the supporting structures of the teeth, and malocclusion will result, often with such infective complications as to make proper treatment difficult or impossible. Among these complications may be named abscessed teeth, which prevent proper growth stimulus from mastication, bring about indigestion and kindred ills from lack of masticating power, pour toxins into the stomach and blood stream, and may seriously affect the developing permanent teeth. Such conditions should be prevented at all cost by treatment or extraction if necessary. I do not agree with those who advocate the retaining of abscessed and broken-down deciduous teeth in order to prevent drifting of adjacent teeth. I hold that such retention is a real menace to general health and to local tissues. Far better to allow drifting and to retain health. Space retaining devices, however, are so simple to make that neither evil need be tolerated. Reference is made to the work and writings of Dr. P. C. Willett[20] of Peoria, Ill., and others for admirable methods along this line.[21] I have used this type of restoration to excellent advantage and also have restored masticatory powers by addition of cast pontics soldered to simple orthodontic appliances, thus giving artificial stimulus to growth through these appliances and restoring the powers of mastication at the same time.

OTHER CONTRIBUTING CAUSES OF MALOCCLUSION

Malocclusion from too long retention of deciduous teeth is another cause for which there is little or no justification. The dentist or orthodontist, especially those in schools or other clinics, should not allow this to occur.

Many malocclusions result from the presence of supernumerary teeth, malformed teeth, congenital absence of teeth, impacted and suppressed teeth, malformations of bone such as cleft palate, accidents, diseases of bone such as osteomyelitis, and other causes.

Some orthodontists have recently stated that perhaps too much importance has been attached to the presence of adenoid tissue and abnormal tonsils as a cause of malocclusion. Even though they be correct, however, it cannot be gainsaid that infective processes may be set up which will have a harmful effect on the general system and thus indirectly affect development. It is certain also that adenoid tissue does interfere with normal breathing and that enlarged tonsils do cause a misplacement of the tongue and thus tend to cause malformations of the dental arches. Dr. L. S. Lourie of Chicago pointed out in a presentation in 1930 that he had found malocclusions due largely to the tongue being habitually held in an abnormal position, not necessarily enlarged but, for example, spread out on the floor of the mouth, causing en-

largement of the mandibular arch and consequent mesioclusion of the teeth. He suggested in such cases that an endeavor be made to train the patient to hold the tongue in its proper position in the mouth as well as using other corrective measures.

Early and frequent examinations will disclose most of these conditions, and simple procedures will usually correct them, or reference can be made to other branches of the healing art if necessary.

The presence of supernumerary teeth will frequently prevent eruption of normal secondary teeth or cause them to erupt abnormally. If any tooth fails to erupt at its proper time, radiographic and other examination should be made to discover the cause and prevent consequent malocclusion. In this connection it should be observed that the routine making of radiograms is of the most marked value in assisting in early diagnosis of malformations, irregularities, small proximal carious cavities, and many other underlying causes of malocclusion.[16, 18]

Malformed teeth and congenital absence of teeth are usually observed in the permanent dentition, but any indications of such should be noticed and early steps taken to remedy adverse conditions.

Accidents appear to be on the increase; immediate correction of resulting malformations will go far toward preventing more serious results.

The importance of the very best treatment of cleft palate need scarcely be mentioned. Fortunately modern operations for closing the clefts have resulted in the saving of many teeth which formerly would have been lost. These cases require the most careful handling in order to obtain the best possible results. Again the importance of early and constant care in preventing the most serious malocclusions is emphasized. Early and constant vigilance is surely the price to be paid in order to attain this end.[22, 23]

IMPORTANCE OF EARLY DIAGNOSIS AND ORTHODONTIC TREATMENT

Just as the careful, observant, and well-trained dentist can recognize gingivitis in its most incipient stages, so ought he and the orthodontist in collaboration recognize the earliest manifestations of maldevelopment of the masticatory machine and take the proper steps to correct it and prevent further maldevelopments. In the foregoing many of these steps have been mentioned, but in many cases it will be necessary to resort to the artificial forces obtained from mechanical appliances. Here again, as a general rule, the earlier these are resorted to the simpler they can be, and also they will be required for a shorter time. In the words of Dr. A. P. Rogers: "Remove interferences and place the jaws in a position of mechanical advantage" and you have accomplished a very great deal. With the restoration of normal function and of comparative health of oral tissues the problem is solved for the vast majority of cases. It is important to remember that the better the health, the better Nature responds to outside stimulation, and more particularly does she do so at those periods of rapid developmental growth. These periods vary in different types, but a careful inquiry into family history and observation of the case under care will assist in deciding this point.

Many orthodontists have found that simple lingual or labial arches with auxiliary springs worn for a few weeks or months will prevent the development of severe malocclusions. Similarly in various types of cases cast incisal onlays, or overlays, will correct developing mesioclusions, and buccal planes do the same for distoclusions, etc. Orthodontic literature contains a large number of case reports and other allusions to such methods. It is noteworthy that the authors are among the most outstanding members of the profession.[1, 6, 11, 12, 20, 21] I feel, however, that too little publicity is given to what I term preventive methods. This applies to the orthodontic profession but more particularly to the lack of knowledge and interest among the members of the dental profession, and public health bodies of all kinds. What greater piece of work could be done in the field of preventive medicine than for the orthodontic profession to teach these bodies, collectively and individually, the steps to be taken to increase in a marked degree the efficiency of the masticatory machine in future generations, thus greatly improving health, comfort, and happiness.

In conclusion it seems apparent that the requirements of an orthodontist who desires to assist Nature in "building efficient masticatory machines" are a thorough working knowledge of the embryology, histology, biology, anatomy and physiology of that machine, together with a sound training in etiology, diagnosis and treatment from the standpoint of prevention of those complex and sometimes incurable malocclusions which are so prevalent today.

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TREATMENT OF NEUTROCLUSION*

Case Reports

Leland R. Johnson, D.D.S., M.S.D., Chicago, Ill.

Case 1.—A. C., a boy six years and seven months of age, presented for treatment Jan. 24, 1929. Both arches were narrow, and the maxillary and mandibular incisors were rotated. Respiration was normal; the adenoids and tonsils had been removed at five years of age. There were no habits evident. The labium frenum was of low attachment. Hygienic condition of the mouth was excellent. The median line was normal in both arches. The brother of this patient presented at the same time, and both boys had long, narrow faces. The same type of face was common in the father and the father's brother. The x-ray pictures were very poor but enabled me at least to count the teeth and determine that the teeth apparently were all present.

Etiology.—There was a lack of normal width resulting from an arrested development of the arches.

Treatment.—The mandibular second deciduous molars were used for anchorage, and gold shell crowns were swaged for attachment. A mandibular lingual appliance with finger springs was used to expand the mandibular arch. Expansion of the maxillary arch was gained through occlusion with the mandibular arch. Force was applied March 7, 1929. Nov. 1, 1929, a maxillary labial arch with intermaxillary hooks was applied, using the second deciduous molars for anchorage. Intermaxillary force was applied November 6 to correct a tendency for the case to go into distoclusion. Jan. 10, 1930, the teeth were in a position of mechanical advantage, and exercise was given for the masseter and temporal muscles. Elastics were worn only part of the time, because of lack of cooperation. Eventually a normal relation was obtained, and the elastics were gradually discontinued and were entirely discarded Dec. 3, 1930. The mandibular lingual appliance was worn as a retainer until July 24, 1931.

The case is now under observation, and, although treatment may be necessary before the patient reaches adulthood, any period of treatment will probably be of short duration.

Case 2.—P. C., a girl aged nine years and two months, presented for treatment Sept. 18, 1930. She was a normal breather; the adenoids and tonsils had been removed at four years of age and the adenoids again removed at six years of age. There was no history of any habit whatever. The frenum was a trifle low but not considered abnormal. She was of average build and appeared healthy and well nourished. The occlusion was characterized by a normal mesiodistal relation of the mandible to the maxilla. The maxillary central incisors were erupting in torsiversion, and there was insufficient space for the

*Presented to the American Board of Orthodontia.

mandibular right lateral incisor. The maxillary left first permanent molar was locked in linguoversion.

The x-ray pictures showed the permanent teeth all present and apparently developing normally; however, there had been no absorption of the maxillary right lateral incisor and the roots of the deciduous molars showed no absorption.

Etiology.—There was an arrest in the lateral development of the mandibular arch, cause unknown. It was possible that there had been indulgence of a pressure habit, such as pillowing or propping at the time the maxillary left first molar came into occlusal contact with the mandibular first molar.

Treatment.—In this case a maxillary labial arch with a lingual extension on the maxillary right side was used. Swaged gold crowns were used on the first permanent molars for anchorage. On the mandibular arch a lingual appliance was used with auxiliary springs.

The movement of the maxillary first molar seemed slow, so intermaxillary hooks were soldered on the lingual surface of the maxillary crown and on the buccal surface of the mandibular left molar crown, and intermaxillary force was applied. Attachment bands with spurs were used for the rotation of the maxillary central incisors. Through the winter of 1930-1931 the patient experienced a great deal of ear trouble. The ears were still running May 11, 1931. The case was placed on retention Nov. 20, 1931.

The retainers consisted of a fixed lingual appliance on the maxillary teeth and a fixed-removable lingual appliance on the mandibular teeth. The maxillary incisors were retained by soldering a wire connecting the labial surfaces of the attachment bands. These retainers were worn three months; then it was deemed advisable to use the second deciduous molars as anchorage for a retaining appliance carrying an extension to prevent any lingual movement of the maxillary left first molar and to permit the normal rotation of the permanent molars into their normal position as a result of the forces of their inclined planes.

X-ray pictures made April 1, 1932, showed no absorption of the deciduous molar roots at the age of ten years and eight months. The canine roots were absorbed, and the mandibular right deciduous canine had been shed.

The results of this case have been satisfactory, in that the denture is considered normal for the patient's age.

My conclusions and observations in this case are that first permanent molars should not be used as anchorage for a retaining appliance before normal intercusping of the molars if it is possible to avoid it. I believe the maxillary right deciduous lateral incisor should have been extracted at the beginning of treatment instead of being permitted to absorb and shed. The maxillary right permanent lateral incisor is now erupting slightly in labioversion, and I hope the normal lip pressure may guide it into its normal position.

Case 3.—M. G., a boy, ten years and six months of age, presented for treatment Nov. 28, 1927. He was a normal breather; the adenoids and tonsils had been removed at two years of age. The frenum labium was a trifle low in attachment, and the median line in both arches was normal. The maxillary left central incisor was locked in linguoversion behind the mandibular incisors. More space was needed for the mandibular right second premolar.

Etiology.—Probably there had been prolonged retention of the maxillary left deciduous central incisor, and too early loss of the deciduous second molar.

Treatment.—The maxillary appliance consisted of a labial arch fitted high with an attachment band on the maxillary left central incisor carrying a staple. A silk ligature was used to lift the maxillary left central upward and outward. The case responded very slowly. Finally a finger spring was used instead of the ligature, and the central incisor was in "over the bite" Feb. 25, 1928. During this time a lingual arch on the mandibular teeth was used with finger springs to gain arch form and to open space for the mandibular right second premolar. Considerable treatment was necessary to correct the axial position of the maxillary left central incisor, but this was accomplished and a maxillary Hawley appliance with a bite plane was placed Oct. 16, 1929. By February, 1930, the patient began to wear the bite plane regularly, and definite improvement was noticed. A mandibular lingual retainer was placed April 29, 1930, and was worn until September, 1930. The Hawley appliance was worn until March 27, 1931, and the patient was then dismissed.

The result in this case is entirely satisfactory, and the occlusion functions normally.

The prognosis of this case is favorable.

A CASE OF ANTEROCLUSION WITH MILD MACROMANDIBULAR DEFORMITY*

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HISTORY.—The patient, a girl aged sixteen years, called for examination in January, 1926. The mother exhibited normal dentition, arch relationship, and facial development; but the father, although he presented a mild overgrowth of the mandible, exhibited no occlusal defects other than an end-to-end bite. The mother reports for the child a normal prenatal period, normal birth, and normal development to this age. She did, however, admit having noticed a rather massive jaw development beginning to appear at about the age of twelve or thirteen years, and the relationship of arches shown in the cast on the left in Fig. 1 at a much earlier age. She offered no explanation for having permitted the case to go untreated until such a late date. The history of nutrition, rest, and habits is negative. Tonsils and adenoid tissue had been removed at the age of twelve years.

Attributed Etiology.—After a careful study of all of the facts concerning this case, with normal lip tone and tongue position, normal breathing, and all other occlusal factors ruled out, I feel that remarks concerning etiology would be, at best, conjectural. The similarity of jaw development existing between daughter and father do point, however, to a hereditary relationship. I am satisfied that this case must depend for its etiology upon remote rather than proximate factors.

Diagnosis.—Bilateral anteroclusion associated with mild macromandibular deformity.

Treatment.—In this case treatment was instituted in the form of a maxillary lingual wire adapted to the cervical surfaces of all the teeth except the second molars, and a mandibular labial wire adapted to the cervical surfaces of all the teeth except the second molars. Intermaxillary elastics were used between hooks in the canine region of the mandibular labial wire and hooks on the mesiobuccoclusal angles of the maxillary first permanent molar bands. Realizing the possibility of creating a deep overbite, I instructed the patient to keep her mouth closed as much as possible in order that the pull of the elastics might be parallel to the occlusal plane. These appliances were cemented in March, 1926, and removed February 12, 1927. During this eleven-month period of treatment there was some tendency at first for the bite to open under intermaxillary stress, but this was helped by means of mandibular central and lateral incisor bands, with labial spurs under which the wire was permitted to rest. Elastics were worn constantly for five months, and only at night the following two months, alternate nights the next two months, two nights a week the next month, and one night a week the last month. In November, 1926, the

*Presented to the American Board of Orthodontia.

patient was trained in the use of masseter-temporal exercises, and it was explained to her that her assiduous compliance with this advice might materially effect the end-result. Further treatment was advised with the object of rotating the maxillary lateral incisors, but the parents and the patient alike were so well pleased with what had been done in so few months on what had seemed to them an extreme case, that they were not in sympathy with the idea of further treatment. The films in Fig. 2, taken January 26, 1926, show the third molars present.

Fig. 3 shows the facial form before treatment; Fig. 4 shows the facial form five years after completion of treatment, no appliances having been used in the

Fig. 1. Fig. 2.

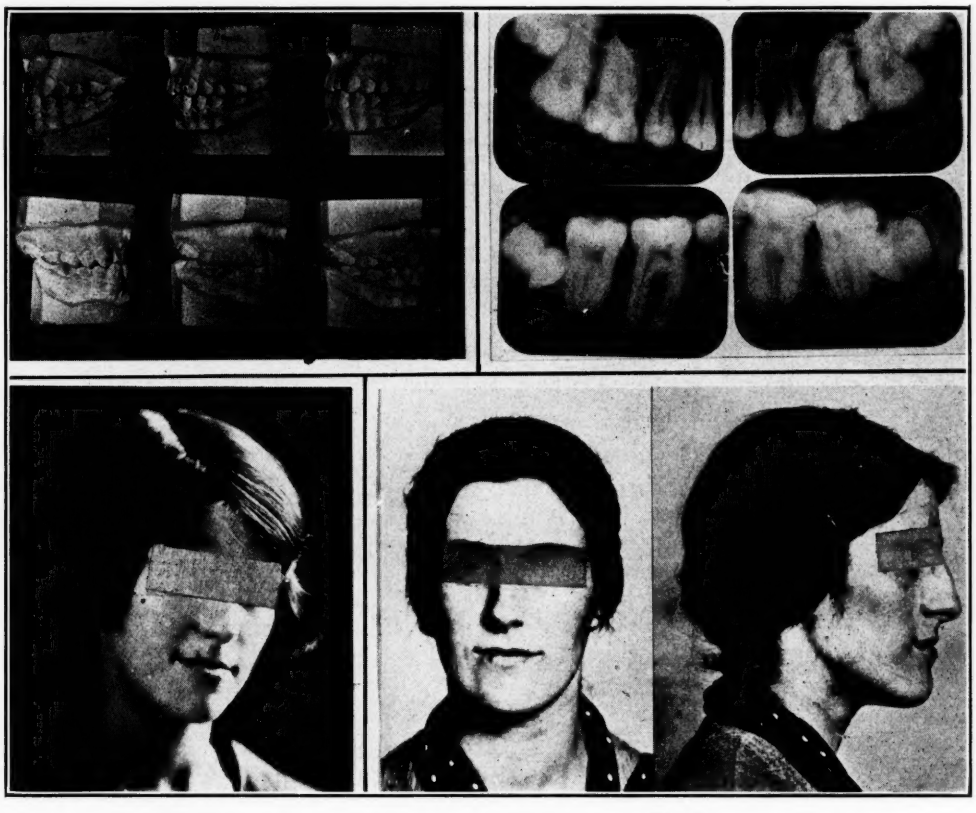

Fig. 3. Fig. 4.

interim. Fig. 1 shows, from left to right, profiles of casts taken before treatment, immediately after treatment, and five years after treatment.

Prognosis.—In the casts on the right shown in Fig. 1, it will be noted that maxillary lateral incisors incline slightly lingually at their distoincisal angles. In five years' time this is the only undesirable change to be noted. Arch relationship and facial development seem to be going on normally without a tendency to relapse. The patient has passed the period of rapid growth, and I expect a permanently improved condition.

This may be referred to as an example of that large group of cases for which orthodontists may render adequate service in a short time. The active treatment period in this case was eleven months.

COMPOUND, COMMINUTED FRACTURE OF BOTH MAXILLAE AND THE MANDIBLE

T. L. Bradshaw, D.D.S., Peoria, Ill.

MR. U., a lineman, about fifty years of age, was admitted to the Brodstone Memorial Hospital, April 18, 1933, because of injuries received in an accident.

While he had been removing wires from the cross-arm, the pole broke, causing him to fall about twenty feet with the broken top of the pole.

He had landed on his face upon the cross-arm, and sustained severe injuries to his nose, lower lip, and both jaws.

I had known this man for years but did not recognize him because of the terribly bruised and swollen condition of his face.

Examination disclosed the following injuries: fractured nose, fractures of both maxillae, multiple fractures of the mandible, two severe cuts of the lower lip, and a large hematoma in the right side of the soft palate.

The maxillary fractures showed free movement of the parts and lingual displacement of the six anterior teeth.

The movement discernible in the mandible was slight with the exception of the anterior teeth, which were displaced lingually.

There were two horizontal cuts completely through the lower lip. These cuts were approximately two inches in length and about one-half inch apart, running nearly parallel.

The vermilion border of the lip was attached at the corners of the mouth by possibly one-eighth of an inch of tissue.

Because of the hematoma in the soft palate, deglutition was impossible, and the patient had to be fed by means of a rubber tube inserted into the esophagus, through which liquids were poured.

The x-ray pictures (lateral jaw and anteroposterior head exposures) showed the fractures of the maxillae to be as follows: A vertical fracture posterior to and through the alveolus of the left canine. This connected with horizontal fractures of both sides just below the zygomatic processes. These fractures were compounded and comminuted. Both palate bones were fractured anteroposteriorly about the center of each bone.

The mandibular x-ray pictures disclosed an oblique fracture posterior to the right canine, which connected with an oblique fracture passing posteriorly just anterior to the second molar. These were compound comminuted fractures. The x-ray examination also showed alveolar fractures in the incisal and premolar regions.

Treatment.—The incisions in the lower lip were sutured, and the nasal fracture was taken care of immediately by Dr. C. G. McMahon.

It was impossible to reduce the jaw fractures at this time because of the great amount of swelling in the soft tissues. However, at the end of eight or nine days the patient was able to swallow liquids, and the swelling had receded sufficiently for us to care for the jaw fractures.

The maxillary fractures were reduced, and a splint similar to the Kingsley splint was applied.

This splint is constructed in the following manner: A mandibular impression tray, with the handle removed, is riveted to two pieces of stiff wire about $\frac{3}{16}$ inch in diameter.

This wire is turned on itself so as to bring the wire parallel to the cheeks, care being taken to make the curve sufficiently far forward to clear the corners of the mouth but not far enough to cause the appliance to project too far from the mouth.

On these parallel arms loops of fine wire should be soldered to supply attachment for the rubber bands. These bands are to be fastened to a head cap.

The cap may be made after the style of the old skull cap. The only requirement is that it be close fitting and of strong fabric.

The rubber bands are best fastened to the head cap with safety pins. This gives an easy way of adjusting the amount of traction exerted on the appliance, and in this case the bands had to be adjusted every day or two.

By making use of an impression tray, modelling compound (preferably black, quick setting compound, because there is not likely to be so much change in the mouth) can be inserted in the tray and an exact, close fitting splint obtained.

The mandibular fractures were taken care of by interdental wiring, of phosphor bronze orthodontia wires. These are safe to use because they are not affected by mouth secretions.

All the fractures united beautifully without infection in eight weeks' time. (That there was no infection was undoubtedly due to this man's excellent physical condition.)

The teeth lost were the maxillary left lateral incisor, canine, and both premolars; the mandibular left lateral incisor and canine and also the mandibular right lateral incisor and canine. These were extracted because of lack of stability and further usefulness.

The restorations used to supply these teeth were a maxillary unilateral palatal bar clasping the right canine, the left central incisor and the second molar.

The mandibular teeth were replaced with a lingual bar clasping the left second premolar and the right first premolar.

The maxillary right molar and premolars were slightly in lingual occlusion; so they were corrected with gold shell crowns.

Dr. McMahon and I feel that this case is worth reporting because of the severity of the injuries, and because of the increasing number of jaw fractures.

Dr. McMahon during his fourteen years as an industrial surgeon, where accidents were plentiful, never had seen a case that compared with this one from the standpoint of severity.

We have treated a number of fractures of the jaws resulting from auto accidents, but this one exceeds any of them in amount of damage done.

This man has made a wonderful recovery and from an esthetic standpoint shows very little disfigurement. From the standpoint of utility, I should say his denture is at least 80 per cent normal.

SUMMARY

1. In fractures of the jaws, x-ray pictures are absolutely indispensable not only for diagnostic reasons but also for protection in case of any contention, i. e., damage suits.

2. It is good treatment to wait for swelling to subside before attempting reduction and immobilization in severe jaw fractures.

3. Where possible I prefer to use interdental wiring, with phosphor bronze wires. (The technic of wiring can be found in a number of books on oral surgery.)

4. In cases of fracture of both jaws, it is impossible to secure immobilization with interdental wiring, and splints must be resorted to.

5. Where splints are necessary, the simpler they are, the better. In fact the less complicated the treatment, the more comfortable the patient and the better the end-results.

6. The best results are obtained in these cases by frank cooperation between the surgeon and the dentist.

7. Because of the increase in number of these cases, surgeons and likewise dentists should inform themselves as to the proper way to care for them.

Dr. Herbert E. Pullen

Word has just been received of the sudden passing away of Dr. Herbert E. Pullen of Boston on Sunday night, February 17. Doctor Pullen was another of the very early specialists in orthodontia. He attended one of the first Angle classes in 1898 or 1899. The orthodontic fraternity will lament and regret exceedingly the great loss of one of the pioneers of the specialty, a man quite generally regarded as an artist in his line.

Department of Dentistry for Children

INTERESTING INFORMATION IN REGARD TO PUBLIC DENTAL HEALTH EDUCATION

THE following information will be of considerable interest to all who are interested particularly in child welfare and dental health education.

The Committee on Public Dental Health Education of the St. Louis Dental Society (L. R. Main, chairman) has organized a speakers' bureau of twenty men. It is the purpose of the bureau to extend dental health information to the public. The speakers are admonished by the committee and are expected to be prepared to make thirty-minute addresses when and where called upon. The Committee insists that none of the speakers read formal papers but prepare lectures on interesting and important topics pertaining to dental health. The speakers are expected to prepare outlines of their talks, carbon copies of which are to be kept on file by the Committee as a matter of record.

Suggestions for the type and form of these speeches for extending public health information follow: seven or eight minutes for introduction, fifteen minutes for an explanation of the local survey, and approximately seven minutes for closing. A short compact excerpt from the proposed introduction is built somewhat on the history of dentistry. "Some phase of dentistry has been practiced after a very crude fashion as far back as there is any record, as revealed by the excavation of buried cities, etc."

Further excerpts from this outline follow:

"Dental decay is not only a modern disorder. Diseases as far back as prehistoric man can be traced. In the excavation of some of the Egyptian mummies indication of dental pathology and pyorrhea was quite common. Modern civilization tends to foster an increase in dental disturbances, etc. In ancient times, those who endeavored to operate upon the teeth did so purely for personal adornment with no thought of preservation.

"Modern dentistry is a very young profession. The first dental society was founded just 100 years ago. The first dental college was organized in 1840. The first university with a dental department was Harvard, and was organized in 1867. Now there are about 40 schools. Dr. G. V. Black is called the father of modern dentistry.

"Today, modern dentistry endeavors to preserve the teeth because of their value for mastication, for facial contour, for speaking, for personal appearance, but most of all to keep the teeth and mouth healthy so that good general health will be maintained, etc.

"Definitely known diseased teeth can and sometimes do disturb normal health, etc.

"Present knowledge is based largely upon research carried on by and under the supervision of organized dentistry.

"Medical science progresses through channels of prevention: typhoid, diphtheria, smallpox, etc.

"Dentistry is likewise entering the field of prevention through education of the public. Reparative dentistry is not enough. An effort must be made to prevent dental diseases as far as possible. Disturbances can be checked to a great extent by education. Not only should the parent be taught how to care for the child's mouth, but the child itself must be taught. A clean tooth and a well-fed tooth resists decay. The mouth is the gateway to health and also the chief gateway for the entrance of infection; therefore it must be kept clean.

"The prevalence of dental disorders can best be appreciated by a study of the recent (1933) survey of every child attending the St. Louis schools.

"Conditions in St. Louis are no worse than those elsewhere. In Chicago the percentage of dental defect is 96.4 per cent among school children; in Andover, Mass., 96.9 per cent.

"This survey reveals the condition among school children. Science has proved that dental defects, decayed and abscessed teeth are responsible for many disorders throughout the body. The situation should receive serious thought by all parents. The question naturally presents: what can be done to prevent such a condition from continuing or becoming worse? The answer is in the education of the public, and a dental health program in the schools under the supervision of a director of oral hygiene.

"The following information has been received from the American Dental Association:

"Statistics compiled by the Chicago Board of Education show that it costs $81 a year to educate a child, or 9 cents an hour. Every hour that these children lose because of toothache or dental disorders costs the taxpayers of Chicago 9 cents. Multiply that by 600,000, the number of school children, and you can readily see what this disease alone is costing Chicago.

"When we stop to consider the number of children who have become ill owing to lowered vitality resulting from abscessed and infected teeth, this figure can be multiplied many times over. It has been conservatively estimated that Chicago spends $3,500,000 a year to educate repeaters, 70 per cent of whom are retarded by physical ailments. Further, it has been estimated that at least 25 per cent of these repeaters could be saved by curing their dental disorders. If this is true, dental defects in Chicago schools are costing the taxpayers $850,000 a year.

"A committee of dentists in the city of Boston recently estimated that it cost 3 cents an hour to educate a child in the parochial schools of that city.

"Dr. Keyes, of Boston, who has done considerable work on mouth hygiene education of school children, reports that in the Boston schools there was an increase in daily attendance of 2.8 per cent after the children had received thorough dental care. In Cambridge, Mass., there was an increase of 3 per cent after similar service was rendered. In other words, he estimated that

in the Cambridge schools alone a saving of $25,000 was made by the school authorities by the installation of mouth hygiene educational service for their children.

"In Atlanta, Mr. Sutton, superintendent of schools, reports that in one school in which dental instruction and care were installed 1,200 school days were saved in one year's time. Mr. Sutton further reports that, after five years of intensive dental education and care, every child in the public schools of Atlanta had 100 per cent teeth, no dental defects, and no dirty teeth. He further estimates that his school dental program has saved the taxpayers between $200,000 and $250,000 a year. The saving to the individual child in better work, increased efficiency, and more rapid transition from grade to grade can never be estimated.

"Athens, Ga., a small sister city of Atlanta, reports that every one of the children in her public schools has 100 per cent teeth. This was accomplished by three years of hard work on the part of the school board, the health department, and the local dentists.

"Toronto, Canada, reports that in ten years its health department reduced the number of cavities in the mouths of the children from an average of seven to an average of two for each child.

"Dr. Fones in Bridgeport, Conn., reports that in five years the school authorities reduced the number of repeaters 65 per cent by teaching mouth hygiene. In Boston, at the Forsyth Dental Infirmary, the number of extractions of first permanent molars was reduced from one in three to one in 200 by five years of intensive preventive dentistry in the public and parochial schools.

"In Peoria, Ill., a director of oral hygiene has been in charge of the educational work in the schools for several years. His report in December, 1934, indicated that 24 per cent of all the children of the 22 schools needed no dental attention."

In addition to the above outline, the speakers' bureau is provided with the summary of the Elementary School Survey conducted by the Survey Committee of the St. Louis Dental Society (O. W. Brandhorst, chairman). The analysis of this survey is interesting to every one particularly interested in children's dentistry or orthodontia. The Committee reports in the analysis of the survey: "Survey was made by the members of the St. Louis Dental Society in 1933. The survey of oral conditions of the children in the St. Louis schools revealed the following facts:*

"1. The need for dental attention is much higher than previously recorded by physicians' or nurses' examinations. It averages above 95 per cent.

"2. The need for dental attention is urgent in all groups, public, Catholic and Lutheran—colored as well as white.

"3. The need for dental attention is even greater among special or retarded children than among others.

*As reported in the summary of the clinic on "Oral Health for Every Child," by the St. Louis Dental Society, August, 1934.

"4. Dental conditions among the children vary only slightly in various parts of the city.

"5. Abnormal gum conditions exist in about 7.5 per cent of cases.

"6. Prophylaxis is needed by about 87 per cent of the children.

"7. 59,042 teeth were prematurely lost, of which 28,808 were permanent teeth.

"8. 375,276 teeth had cavities, an average of 3.15 cavities per child.

"9. 134,622 teeth had been filled.

"10. 51.4 per cent of those examined had malocclusion, but the percentage of malocclusions among children with speech defects was only slightly higher than that in those with no speech defect.

"11. 12,968 children were irregular in attendance at school; and of those, 1,728 had poor oral health and 5,771 had only fair oral health, making a total of 7,299 or about 56 per cent with poor or fair oral health.

"12. 27,937 children were checked as retarded in school progress. Of these, 1,178 had poor oral health, and 7,031 had only fair oral health; a total percentage of 25 per cent with abnormal oral health. If a child retarded in school progress is a potential repeater, and if it costs $80 in the grade schools and $160 in the high schools for a child to repeat a year's work, it is easy to figure just what an expense such a condition might be.

"13. Only 44,034 (46 per cent) had good oral health, and of these only 2 per cent had poor physical condition; while 64,379 (54 per cent) showed only fair or poor oral health, and of these 22 per cent showed poor or only fair physical condition.

"14. The peak of poor oral health is reached in the fifth or sixth grades, or about ten or eleven years of age, at which period the deciduous molars are being lost.

"15. The reference to the use of the toothbrush, 36 per cent brush the teeth regularly; of these 64 per cent have good oral health; while in the "occasional" group representing 47 per cent of all, only 36 per cent have good oral health.

"16. Of the 46 per cent with 'good oral health,' 50 per cent brush their teeth regularly; while of the 54 per cent representing 'fair' or 'poor' oral health, 76 per cent use the brush only occasionally or not at all.

"The evidence of having received dental attention is contradictory to past statements. As age increases, evidence of having had dental attention after they have passed through the grade school.

"In view of the fact that nearly all of those examined are in need of dental attention, whether in the grades, high school, or teachers' college, in spite of the fact that most of them have had dental attention, our conclusion must be that they do not appreciate the full benefits to be derived from dental services, or realizing it, for some reason or another, do not avail themselves of it.

"After much deliberation, the St. Louis Dental Society outlined an extensive program to meet the conditions found.

"It recognized its own responsibilities to the public by realizing that information for the public in oral health matters should and must come from

the dental profession. It also recognized the fact that, by law, the profession was the only agency set up for rendering dental service. It also recognized the fact that the school systems were the agencies set up for imparting knowledge to the child for its training for future citizenship, and that knowledge in health matters was an important part in such a program of instruction.

"It recognized also that a program of any kind, to be effective, must have a twofold purpose; namely, to prevent if possible a recurrence of the same condition, as well as a repair of the damage done. One without the other meant failure.

"There seems to be a very definite relationship between:

Oral health and general physical condition,
Oral health and school attendance,
Oral health and school progress.

"According to the superintendent of Atlanta public school system: 'There are some things that cannot be reduced to simple arithmetic. The social, moral, and character-developing influence of a clean mouth and a healthy body perhaps means more than the saving in time or money by the school system. . . . Nevertheless, those students suffering from poor oral health are potential "repeaters."' The cost per child is $80 per year in the grade school and $160 per year in the high school. Therefore the actual money cost is alarming. Dental attention alone seems inadequate.

"Thus repair and prevention must be coordinated in a plan of public dental education if our aim of oral health for every child is to be achieved.

"The American Dental Association should assume the general supervision and direction of an oral health program, so that uniformity of information will be presented.

"The dental office should be the source for rendering service, so that the public will not become dental-clinic minded.

"Schools as the agencies for imparting knowledge must assume this responsibility; also they must offer proper oral health information.

"The Government should cooperate generally in such a program, thereby maintaining the dentist-patient relation, saving the taxpayer an expense, and making dental services available to all people."

THE OFFICE MANAGEMENT OF CHILDREN*

FRANK F. LAMONS, D.D.S., ATLANTA, GA.

A GREAT deal has been written about the management of children in the dental office, and I believe that when reading these articles we are likely to feel that children are very difficult to handle, or that a special knowledge of psychology, and particularly child psychology, is required to work with them successfully. I sincerely believe that the average dentist can successfully manage children if he makes up his mind to do so.

I would lay down three general rules:

The first is to have a sincere appreciation of dentistry for children and what good dentistry means to them.

The second is a willingness to take the time necessary to understand the child.

The third is patience, and lots of it.

The first reason given should not enter into this discussion. By "appreciation," I mean real dentistry and not patchwork in order to get the child out of the office.

The second reason, a willingness to work, requires more thought. I maintain that any dentist can get good results with children if he is willing to work on them. He should manifest a real interest in the future of their mouths and a willingness to share his responsibility in the future of their mouths.

Dentists have often remarked, "I like to work for children, but they give me the jitters. I just can't do it."

The dentists who make statements of this kind do not show the proper spirit, nor the willing effort that is necessary in order to accomplish satisfactory work.

Patience is perhaps the most necessary of any virtue in handling children. The same patience expressed in handling the nervous adult if spent on children would accomplish exactly the same thing. No dentist would throw up his hands and quit if he was working on a nervous patient and say, "I just can't do it. You give me the jitters. You will have to let your teeth go until they fall out and then have plates made." If the same thing is done for children, no result in handling them can be expected.

There are four types of children who come into a dental office. The first type is the frightened child. He has heard from his playmates or from his elders about some painful operation the dentist has done (and do not forget that the average adult magnifies the pain in dentistry). The timid, frightened child must be reassured. You must have patience enough to overcome the fears of this child and to reassure him. You should do it in a gentle manner, talking in low, modulated tones, and explain your work to him very carefully in language

*Read before the Florida State Dental Society, Pensacola, Fla., October 19, 1935.

that he can understand. It will take a little time to gain the confidence of this child, but once gained, he is a friend for life.

The second type is the child who is shy and bashful. You can spot him quickly when he first comes in. Friendliness and a little kidding will draw him to you and make a good patient out of him. But he may always be shy and every time he returns, you may have to get behind the screen of his bashfulness if you are to be successful.

The third type of child is the one who is temperamental and hysterical. This type of child usually has an environment at home that creates this temperament. The parents are nervous and hysterical, particularly the mother. The child expects the mother to sympathize with him in everything, and often the mother is so sympathetic that even before entering the operating room the child will become hysterical. You must be very firm with him; seat him in the chair, dismiss the mother from the room, and begin work. If you will always smile and talk in low tones, but with a very firm voice, he will respond and will allow you to work. Sometimes you may have to threaten him by saying that unless he is good, you will hurt him on purpose, but that if he is still and helps you to fix his teeth you will be very careful and treat him like a man. He may continue to cry while you are working on him, but this should not bother you. The dentist who stops working when the hysterical child begins to cry, immediately gives that child a weapon to hold over his head. He has been accustomed to getting what he wants at home by crying, and he expects to do the same thing with you. When you are through with him, a kindly word assuring him that you are still his friend will often bring him back in a better spirit, and eventually he will make a good patient.

The fourth type of child is the incorrigible child, the child who is spoiled and always has his way at home. When he says *no* at home, he means *no* and usually has his way. It is necessary to convince this child that regardless of what he says or does, you are going to fix his teeth. In other words, you call his bluff. If you go to work and show him that you mean just what you say, he will become very cooperative. This is the child who often has to be held. He shrieks and carries on and is likely to lead every one in the building to believe that you are killing him. That is the weapon he has been using at home, and he expects it to work on you.

I sometimes hold a towel over the mouth of such a child, but I tell him that when he quits crying and lets me work I will take the towel away. Sometimes it is even necessary to hold his nose, and while it is not very pleasant, the sensation of smothering usually subdues him. Always explain to the parents before doing this. Tell them very frankly that you will hold the towel over the child's mouth only to keep him from disturbing the other tenants in the building. If you assure them that you will not hurt him, the parents will always cooperate with you. It is sometimes necessary to use this method on even the worst child. It is not done often in my practice.

All the types of children which I have mentioned are very distinct, and a very few minutes spent in talking to these children will enable you to place them in the group in which they belong.

Again may I urge patience in handling them. Do not expect children to accept your explanations if they are not put in language which they can understand. Show them what the mirror is, what the explorer is, the cotton; let them feel and handle them and convey to them some of your enthusiasm for doing the work in their mouths as it should be done. Do not expect to deal with children as you do with adults. They respond to love and affection, and if you do not let them take advantage of your kindness, they always make good patients.

The management of the parent may become a greater problem than handling the child. Parents are likely to handicap your efforts to gain the child's confidence by answering questions directed to the child or by talking too much about the child's complaints. Or they may feel that they are helping you by explaining to the child every little thing that you do. The child should be the central figure in the operating room. You should direct your conversation as far as possible to the child, and the mother should only talk when you ask her for specific information.

With the first two types of children—the frightened and the bashful—the presence of the mother is helpful. It is reassuring to the child. After the first few appointments, the parents may or may not come into the operating room, just as they desire; it really will not make a great deal of difference because you will have gained the child's confidence.

With the third and fourth types—the hysterical and the incorrigible—the parents should not be in the operating room. These children expect and get sympathy from their mothers which keeps them upset emotionally, and when the parents are out of sight they are much better patients.

The equipment necessary to do dentistry for children is very little in addition to that which the general practitioner already has. One corner of the reception room should be fixed up for children. A small table, two or three chairs, with books and magazines suitable for four to six year olds are necessary. The older children like to feel more grown up and will use the adult furniture and magazines.

A board across the arms of the operating chair (similar to that used by barbers) is very desirable. This makes the chair adaptable to the smaller patients; the larger ones can be accommodated by merely adjusting the chair. An operating stool is almost indispensable, and particularly for the first few appointments. It will put the child's eyes on a level with yours, and help you to overcome that feeling of fear which he is likely to have when you are standing over him. "The enemy never looks quite as big if we are looking down on him."

Do not make your first appointments long, but do something each time the child comes. After the child becomes acquainted with you and your office, he may be kept for a much longer time. You can always tell when he is getting tired, and govern yourself accordingly. It is never wise to tax his patience and endurance by too long appointments.

CAVITY PREPARATION IN DECIDUOUS TEETH*

STEVE A. GARRETT, D.D.S., ATLANTA, GA.

IN GENERAL the dentist who is well versed in the general principles of cavity preparation as pointed out by Black, will, with certain necessary modifications, find them almost as correct for children as for adults.

Much depends upon the recognition of these differences in structure and anatomic form of the deciduous as compared with the permanent tooth. Among the greatest differences are the bell-shaped crown and the definitely constricted neck of the deciduous molar in contrast to the lesser sharp angle of the succeeding molars.

The enamel is more brittle.

The dentin is much less hard.

The pulp chamber is much larger proportionately, and therefore there is considerably less hard tissue in which to shape the cavity and to find retention.

For the average practitioner I believe that only two classifications are necessary: (1) the age of the child; and (2) the type of tooth (whether incisor, molar, etc.).

In cavity preparation, the operator must consider the age of the child and the length of service he expects from the restoration. He must consider the type of tooth for the kind of service, whether grinding or incising, and he must plan accordingly.

Transcending all other rules, however, is one to which but rare exception must be made: *All decay must be removed.*

The operator must approach to correct shape, always being mindful of the ever present enormous pulp, which is ready to fly at him then or later.

Many men use chisels and excavators almost exclusively in the preparation. In the hands of one who is skilled with these hand instruments it must be almost an ideal method. It has been my custom, however, in the preparation of all cavities to use the engine wherever possible. Usually a small-headed, contra-angle hand piece is employed because of its ease of insertion and less displacement. Fast cutting stones to go through the enamel are helpful. I have found, however, that sharp cutting, small inverted cone and small crosscut fissure burs will do more work in a shorter time and with less ordeal than almost any other instruments.

Remember always to have an adequate rest for the hand so that if the child moves no damage will be done.

The heat is kept down by a steady stream of water, slightly higher in temperature than the body, directed at the point of junction of the tooth and

*This paper was read at the annual meeting of the Florida State Dental Society, Pensacola, Oct. 19, 1934.

instrument. Color the water a little and flavor it slightly, and the children enjoy seeing how much they can hold before spitting either in the cuspidor or on you.

In general, the fewer number of burs and instruments employed, the more expediently and correctly the preparation may be made. Always bear in mind that changing from one to the other is lost motion and adds to the apprehension of the little patient. By this I do not intend to insinuate that an insufficient armamentarium is advised. I do wish, however, to stress the point that if you will study your motions and adopt each one to some definite objective, more and better service can be given.

In simple fissure cavities I see no reason why a small, sharp, crosscut fissure bur cannot be made to run out the necessary grooves with practically one operation. Ordinarily it is not advisable to do quite so much extending as in the permanent teeth. The idea should be to catch the cavity small and keep it small even if at later visits it becomes necessary to add another filling in a few months. With this one bur a slight retention undercut is just as easily made as to change to another bur. Then a very small cone-shaped stone is used to smooth and slightly bevel the enamel margin. Keep the base just as flat as possible, but do not endanger the pulp in order to so do.

In labial cavities of the incisors and canines the straight hand piece with a similar bur will attain in a few strokes the same objective. In my opinion, all these should be filled until the child is four or five years old. Of course the canine should be viewed from a much longer expectancy.

In the disto-incisal and mesio-incisal cavities of the incisors a step on the palatal surface must be attempted until the child is about four or five years old. From then on, however, it is frequently advisable to polish to a self-cleansing area the proximal surfaces. The arch is already enlarging, and usually no contact point exists. Even after this self-cleansing area is established, a little proximal filling may frequently be used if thought best. Silver nitrate will usually do all that is necessary at this time, however.

In compound cavities of the molars a very broad flat occlusal step is indicated; otherwise the restoration will not stay in place. In the preparation of this type of cavity either a small inverted cone or crosscut fissure should be placed in the occlusal surface farthest from the proximal area. This may be gently but firmly guided and brought toward the step area. This part of the work is the most aggravating and should be deferred to the last. As the bur drops into the proximal part enter it at once into the deepest area, always keeping your eye for as little depth as possible, and draw always away from the pulp toward the margins. This away-from-the-pulp motion creates less pressure and therefore less pain. Polish the margins with the same small stone and finish the cervical margin with a small flexible disk.

If distoclusal and mesioclusal cavities are adjoining, prepare them both at the same sitting, moving your instruments from one to the other. If successful fill the one farthest away from you first, and insert the other filling, after the patient has worn a gutta-percha pack, at a later visit. This gives better vision and easier access for the later restoration.

This method likewise permits a high polish to be given the first filling and renders a good surface for the premolar to erupt against.

In deciduous molars never attempt a mesioclusodistal if it is possible to prevent it. The tooth is too weak and often will split under mastication. Besides, you cannot get the filling in to do any good anyway. Always, if possible, preserve the narrow band of dentine and enamel across the occlusal surface for strength. One exception to this is in cases in which there is a distoclusal in a first molar and sometimes a small break is found on the mesial surface of the second molar supported by an apparently strong marginal ridge. It is then, and only then, good service to make a plain surface cavity of it and treat it accordingly. What has been said above deals only with vital deciduous teeth and takes into consideration that no metallic filling of any size should ever be used in them without some type of cavity lining and a cement base, otherwise the wide open tubules transmitting every minute chemical or thermal shock to the overlarge pulp will soon cause the filling to be a menace.

There are very few cases in which it is necessary to form a cavity where one does not exist. It is indicated, however, when the first permanent molar is in position with an improper contact with the second deciduous molar, and as a result a food wedge exists. In such a condition a contact should be made by preparing a cavity in the deciduous molar and inserting a correctly made inlay to assure a healthy anatomic condition and proper position. This area is the one place where no type of filling other than a correctly contoured and highly polished gold inlay will suffice—that is if you want ideal service.

If our aim is to establish tooth service which will last a long time, an ever watchful eye must be kept on the first permanent molar. Frequently the finest of explorers must skillfully hunt for the tiny cracks and enamel defects. If the patient is under your observation at three-month intervals, it may be all right to polish and flatten the grooves; otherwise you should fill every tooth that has a tiny defect. By a tiny defect I mean one in which the finest explorer hangs and supports itself. If in doubt, take an x-ray picture.

If a proximal cavity exists and the other teeth are in position, nothing but a step will suffice. In the very young, however, make it as delicate and as slice-like as possible. The very broad occlusal step of the deciduous molar will not be so necessary, but make it big enough and strong enough to stand up and stay in; for regardless of whatever else a filling is expected to do and however beautifully finished it is, if it comes out you have rendered no service and are severely criticized.

Occasionally it seems wise to attempt to save a badly broken-down deciduous tooth.

If an effort is made to retain this type of tooth, frequently the best procedure is to make a band, cutting it and festooning it to fit, using it as a matrix, except that it may be left in position indefinitely. Many men are using orthodontic band material for this purpose, and it seems to work successfully. The band is made and cemented in place like an orthodontia band, and the filling is

built up to proper occlusion, carved, grooved, etc. This may be used in a vital tooth; but usually when the vital tooth is so badly broken down, a pulp involvement exists.

However, I have found that a cast crown or a simple shell crown or cast overlay has proved more satisfactory.

In my practice, novocaine anesthesia is rather frequently used. Ever so much easier work can be accomplished when it is employed. It is used particularly around the maxillary teeth because the attainment of anesthesia is so much simpler. Occasionally with a certain type of children nitrous oxide is administered. When either method is used, however, much more care must be exerted in watching for the pulp.

FILLING MATERIALS FOR DECIDUOUS TEETH

B. A. Dyas, D.D.S., Atlanta, Ga.

THE average general practitioner has neglected children's dentistry in his practice not because of a lack of interest but because of insufficient experience. The operative procedure in children's work is somewhat different from that in adults' work. For example, the anatomy and morphology must be given special thought. The porosity of the dentin, the size of the pulp, the thinness and brittleness of the enamel, and the time for the exfoliation of the tooth must all be considered before selecting the material with which to fill the tooth.

Let us study a few points on uses and indications of the different materials for deciduous teeth and first permanent molars, starting with gold foil. You have probably heard and read more about gold foil and have used it less than any other material. There are some indications and many contraindications for its use in children's teeth. The cost makes it prohibitive in many cases. The problem of placing the rubber dam, since a dam must be used to exclude all moisture, the difficulty in managing most juvenile patients, and the length of time and the skill required in packing cause most dentists to turn to other materials.

Many dentists are obtaining good results from filora. This is a foil gold in pellet form, and is used with a liquid preparation to cement it into the cavity. It can be placed without using the rubber dam. Moisture should be excluded from the cavity, but the filling can be continued after drying off if moisture touches the gold during the process of packing. Filora can be packed more easily because it is not held together by cohesive properties alone, and larger pieces of gold can be inserted into the cavity at one time. It is packed by hand pressure instead of by automatic plugger. Some operators, however, believe that the liquid may irritate the pulp.

Gold inlays and onlays have a very definite place in children's dentistry. Inlays are indicated especially on the distal surface of the second deciduous molars and on the mesial surface of first permanent molars when the deciduous molars are lost prematurely. An inlay will restore the normal anatomic contour of the tooth better than any other material. Inlays are indicated in the permanent anterior teeth which have been fractured by accident or have decayed, until complete calcification has taken place when the inlay may be replaced by jacket crowns.

The onlays are used on anterior teeth because they can be placed without any slicing or drilling. Onlays are cast of clasp metal directly to the model—then sprung on the tooth.

The contraindications for inlays are:

The cost of the materials,
The time used in the construction,
Excessive cutting of tooth structure, and
Difficulty of satisfactory cavity preparation.

Copper amalgam, in my opinion, is the best filling material for deciduous teeth because it is inexpensive, easy to manipulate, and is germicidal in reaction. It will not irritate the oral tissue and will set under moisture in mouths in which the tooth cannot be completely isolated. It can be placed in deep cavities without irritating the nerve. It may be retained when the outline of the cavity cannot be perfectly formed.

Copper alloy will not expand nor contract. Some contraindications are: (1) It sets very slowly, even when all the mercury is expressed through a chamois with pliers before the filling is started. (2) The edge strength is rather poor, about the same as that of silver amalgam. (3) The copper in the amalgam will cause the tooth to turn dark; therefore it is seldom used in anterior teeth.

Copper amalgam may be prepared by the regular method (except the expelling of mercury) and rolled into small balls the size of a pea one to two hours before it is to be used. When you are ready to place the filling, take a pellet of the amalgam about twice the size of the cavity, put this in a chamois and with a pair of flat, broad-nosed pliers press out all the mercury, leaving a dry, thin wafer; a small piece of this wafer is burnished into the undercuts, then the surface is indented with a small amalgam plugger and another piece is burnished in the same manner until the cavity is filled.

Silver alloys are used more than any other material because most practitioners are more familiar with it than with any other filling. Silver amalgam in deciduous teeth has a tendency to expand on the margins and the edge may fracture. (There is frequently a recurrence of decay because the silver amalgam has no germicidal properties.) Silver amalgam if placed in close proximity to the pulp chamber will irritate the nerve. This material should never be used without a cement base. If silver alloy is used, a good technic is to place the filling over a soft cement base; this makes an inlay type of filling, because the alloy is placed in the cavity while the cement still has some adhesive properties. All silver fillings should be watched carefully for overhanging margins, and these margins should be trimmed off during the periodical polishing of the teeth.

Silver alloy is a very severe irritant to gum tissue.

The use of silicate materials is seldom indicated in children's teeth. The enamel rods are not so dense as and the dentinal tubuli are larger than those in permanent teeth, and the liquid used in the silicate filling penetrates deeper into the tooth causing more irritation to the nerve. The synthetic porcelains may be used on gold inlays in anterior teeth, and some dentists use them in pits and fissures of the first permanent molars when the cavities are shallow. The technic for this is to take an impression of the occlusal surface of the tooth in a copper band before the cavity is prepared. Prepare the cavity and cauterize with phenol. Insert the silicate into the cavity; lay a piece of cellophane over the filling and with the occlusal impression of compound hold this for the initial

setting. The required time is usually three minutes. The filling is polished at a subsequent sitting. Germicidal kryptex has enjoyed an unusual reception and use in the last few years. Its germicidal properties and natural coloring are perhaps responsible for its popularity. It is similar to synthetic porcelain; however, it sets more rapidly and has a greater crushing strength. It is recommended for anterior fillings in children's teeth and may be used in pits and fissures of the permanent molars by the technic described for synthetic porcelain. It is of great value in cervical cavities that are caused by white decay. A cavity lining must be used before all kryptex fillings are placed.

Cements as filling materials are not at all stable and should be used only as treatments or as a base or temporary stopping.

The mouths of most children have a very high acid reaction, and all cements will dissolve faster than in normal adult mouths. Copper cement seems to stand under mastication longer than the other cements, but unless the tooth is to be lost within three months' time copper amalgam can be used more effectively. Both red and black copper cements are very brittle and unstable.

The zinc cement will give very poor margins and will dissolve in a short while. Zinc cements are not germicidal.

The silver cements are slightly germicidal, but probably are not strong enough to keep down marginal decay. Silver A cement is very good for bases in deciduous teeth, but for a filling material it is without merit.

Contact points cannot be maintained with any cement.

Temporary stoppings are the least used as filling materials, yet some dentists get fair results for a short length of time.

Gutta-percha may be used with chlora resin in very shallow pits that are open "but are not decayed," until the tooth becomes completely calcified. Then a permanent filling is inserted. This type of filling must be watched carefully and renewed often. Temporary stopping is used with copper amalgam and is easily removed for a more permanent filling later on. The copper amalgam is triturated with the mortar and pestle, and the temporary stopping is heated to a semiliquid mass and the two are mixed together. This is used especially when a tooth is to be kept under observation for any length of time. It is easier to remove than cement and will wear longer than temporary stopping and has a germicidal reaction on the tooth structure.

All fillings, whether they are in deciduous teeth or in first permanent molars, should be polished, and until they are polished the fillings are not complete.

Stones and burs are used in connection with saws and small sharp instruments, such as explorers and scalers, to carve the occlusal surface and to trim the margins.

A final polish of pumice and chalk or oxide of tin will give a high luster to the filling. The pits and fissures can be polished with old burs wrapped in cotton to apply the pumice and chalk.

The fillings in deciduous teeth are not carved so deep as those in permanent teeth.

If we are to give our best services regardless of the fee, much time and thought will have to be taken with the filling materials in deciduous teeth.

ETHYL CHLORIDE IN CHILDREN'S DENTISTRY

WILLIAM L. FUNKHOUSER, JR., D.D.S., ATLANTA, GA.

ETHYL CHLORIDE is not a new anesthetic agent; it has been used for about the last thirty years. It was banned in England about twenty years ago as a result of the number of deaths caused by it. Its use was revived in Boston in 1915 at the Forsyth Dental Infirmary. It has been used routinely since that time by the internes, and the records show that it has been administered to one hundred and twenty-five thousand children without a single fatality. The children to whom it has been administered were from the public schools, and no physical examinations were made. For an agent with the above record it is certainly worthy of note.

It is true that generally speaking ethyl chloride as a general anesthetic has a bad name. There are many authorities on the subject who have condemned it. Their grounds for condemnation may be logical; however, we are *not* using the agent as a general anesthetic but as a deep analgesic, and we are confining its use to children not over fourteen years of age. That is the secret of the safety factor.

The agent may be used successfully by any practitioner with a little practice in the administration. The only equipment necessary is a tube of a standard make of ethyl chloride, a rubber mouth prop, and a piece of double mesh, six by six, gauze.

To go into the signs and symptoms of general anesthesia would only be repetition, so I shall describe only the signs in the operating stage of ethyl chloride. The breathing becomes rhythmic and at times a snore is noted; the pupils of the eyes are neither dilated nor contracted, and are usually rolled to one side or the other and fixed off center; the lid reflex is present but sluggish. We term this the operating stage. Do not expect to relax the patient, for if relaxation is reached the patient is in a very deep anesthesia and this is dangerous. The child may be humming, fighting, or trying to talk during the operating stage; therefore an assistant is always necessary.

The technic for the administration is very simple. First the patient is prepared physically; the bladder is emptied and any tight clothing is loosened; the child is seated in the chair with the head well back, to assure free breathing; the mouth prop is then inserted; the gauze is placed over the mouth and nose, the nostrils being held closed with the thumb and forefinger of the operator's left hand. This causes the patient to breathe through the mouth. The patient is then instructed to breathe deep and to blow the gauze off and he will go to sleep. Ethyl chloride is sprayed intermittently on the gauze over the mouth; the meshes of the gauze are never allowed to become clogged with frost. The child will usually take about four deep breaths, then the breath is held for quite a number of seconds. Do not become alarmed at this. When breathing is re-

sumed anesthesia is very rapid. Watch for the signs of the operating stage; this usually takes from sixty to ninety seconds. When the operating stage is reached, proceed without delay to remove the necessary teeth. Anesthesia lasts from one to three minutes. If the induction takes a long time, the child is likely to become nauseated; or if anesthesia is induced on a full stomach, nausea is likely to occur. If for any reason the operation is not completed the first time, do not repeat the anesthetic for at least twelve hours.

The complications are rare, but we must know how to relieve them should they occur. If cyanosis occurs, look for closure of air passages for cyanosis is not caused from the ethyl chloride. If the child stops breathing, use artificial respiration. Syncope is manifested by a sudden change of color and is caused by cerebral anemia. Lower the patient's head and apply stimulants. Shock is manifested by pallor, fast feeble pulse, shallow respiration, and slowness in returning to consciousness. Keep the patient warm, watch his respiration, and apply stimulants.

Ethyl chloride is indicated as an analgesic in children who are not more than fourteen years old for the extraction of deciduous teeth or for any minor oral surgery which will not take over three minutes to complete.

It is contraindicated in cases of respiratory obstruction, tuberculosis, bronchitis, anemia, leucemia, or any form of heart lesion.

Ethyl chloride may be successfully used by the practitioner, and its success will be determined by his good judgment, careful use, and knowledge of the physiologic action of the agent.

SPACE MAINTENANCE AND PREVENTIVE MALOCCLUSION*

TOOF A. BOONE, D.D.S., MACON, GA.

THE use of space maintainers as a preventive factor is not new to the dental profession. For years figures have been available which closely linked early loss of teeth to developmental changes of the skull and later to malformations. Since then, papers and clinics have been given which urge upon the general practitioner the importance and significance of properly maintaining space after early extraction of deciduous teeth.

As members of organized dentistry we should be so inspired with the principles of our creed that we will, in rendering the proper dental health service, prevent the arising of unfavorable conditions which hinder the growth and normal function of the deciduous dentition. Yet records show that in a recent examination of first grade pupils of a certain school district, apparent malocclusion was present in about 40 per cent, increasing gradually in the second and third grades, and reaching a high of 70 per cent in the fourth grade; and of the group, 60 per cent of the children had visited their dentist. This is only an example of the ever present condition, and even though in other districts the percentage may not be quite so high (although in some it may be higher), nevertheless this is a problem worthy of our most serious thought.

The growth of the body from a tiny cell to its present state is a most interesting phenomenon of nature. Of especial interest is the deciduous dentition, which, as a tooth germ, begins to calcify at about the seventeenth week of fetal life. Then it grows and later functions as part of the human mechanism. The terms "growth" and "function" are important because continued stimulative growth and function maintained, are necessary as accessory processes to the finished dentition. Todd† has this to say of growth: "Growth consists of two processes, the addition of substance and the abstraction of substance. (Bone is constantly changing in its modeling.) We must not be misled by the hardness of bone. It is a living tissue and subject to change which is a process of remodeling. This process of remodeling takes place after the premature loss of deciduous teeth and the earlier the tooth is lost, the greater and more unfavorable the change."

The exchange of permanent for deciduous teeth is a natural process, and any disturbance of this procedure resulting from loss by premature extraction will result in a condition easy to visualize, because unless the maxillary and mandibular arches develop uniformly and harmoniously, and the removal and the eruption of teeth are practically normal, the final result will in nearly every instance be malocclusion.

*Read before the Section on Children's Dentistry of the Florida State Dental Society, Pensacola, Fla., Oct. 19, 1934.

†Humphrey: J. A. D. A., November, 1930.

The first consideration of early loss of deciduous teeth is from a preventive standpoint. Let us stop and consider for a moment the normal. It is true, as we were taught when students, that the permanent incisors as well as the canines are much larger than the deciduous anterior teeth. What does nature do? She compensates in most cases by opening up spaces in the anterior region at about four years of age. In the posterior part of the arch the deciduous molars have much larger mesiodistal diameter than the premolars because the arches in their period of growth and adjustment due to functional stimulation necessitate larger dimensions which must be maintained to the full extent, otherwise nature in closing the spaces will not balance the relation of the arches.

What happens when a deciduous tooth is lost early? In the mandibular incisor region the space closes and the arches become narrower with resultant crowding of the permanent anterior teeth. Indirectly in the maxillary arch the permanent incisors become crowded and the overbite is increased. With the loss of a canine the molars move forward and the anterior teeth move distally with resulting crowding of the permanent canine, a result which is frequently found. If a molar is extracted early, the guiding influence of the molar roots is lost, there is slight extrusion of opposing tooth, and the approximating tooth distally moves forward and the mesial tooth drifts distally. This movement is harmful if a permanent tooth is posterior, since it is certain to lose its cuspal relation, and there will be a change of plane of the long axis of the tooth, which is a condition difficult to deal with.

In the secondary consideration of the importance of maintaining space I shall consider esthetics, function, and development. Esthetics, except in regard to the anterior part of the mouth, is of minor importance. If a deciduous central or lateral incisor is lost, I would suggest making a three-fourth or full crown for abutments, and soldering steel backing to an orthodontia tube with a wire inserted. When the tooth is ground in and this is cemented on, it will make a fairly satisfactory bridge and will allow for expansion. Many cases with favorable results have been reported by different practitioners. If only a simple retainer is desired, the approximating teeth can be banded and connected with wire.

In considering function and development I shall begin by saying that early loss is irreparable because nature has contrived that the body should function as a whole and not as a part. Deciduous teeth are placed in the body for a purpose. They are not only organs of mastication, but also important factors in maintaining the integrity of the arches during the development of the permanent denture, both by the stimulus to the underlying structure through their use and by the mechanical maintenance of arch form and size by their presence. Thus, the arch is dependent on every tooth present, and the premature loss of the teeth if not adequately taken care of, will result in improper development, with the resulting shortening of the arch which breaks up the harmony of relationship. The expansion of the arches, or growth, which in the maxilla is forward, outward, and downward and in the mandible is forward, outward, and upward, is dependent on the absolute presence of every tooth in order to convey proper approximating stimulative forces. If a tooth is lost, then this relationship is lost; but if a space retainer is placed, the loss is to a certain degree overcome.

Certainly the results after a little conscientious and judicious space maintenance would not give us today the deplorable high record of apparent malocclusion prevalent in the face of such a high standard of dentistry.

There are many different types of space maintainers. I believe the most ideal space maintainer would be one that restores as nearly as possible the missing tooth or teeth normally. I shall enumerate only those most widely used, together with the types of material, which in my practice happens to be gold platinum, but this has been successfully taken care of by the recently developed stainless steel.

The first type is the simple band with connecting wire and C clasp. This was probably one of the first types developed and has been extensively used. The procedure may be by direct method, by indirect method, or by direct-indirect. Some operators prefer to make the bands in the patient's mouth; if so, then their task becomes even simpler. My technic is as follows.

1. Take a piece of band material (gold platinum size 0.007 for the posterior teeth and 0.005 for the anterior teeth). Plain band material may be used or Baker's seamless bands. In using the plain band material, carry it to the mouth, crimp to conform to the tooth with band forming pliers, remove and solder. Trim or relieve and carry to place, taking care to have the band fit properly at the gingival surface. Take a compound or plaster impression. Remove and seal in the band with wax, and pour with hard setting stone.

2. Take a piece of orthodontia wire, size 0.025 or 0.030, and with wire bending pliers conform a C clasp to the connecting tooth. Then span a piece of wire along the gingival surface and solder one end to the band and the other to the clasp. Polish and place the appliance after checking to prevent any possible impingement of tissue.

There are several variations of this type. The connecting wire may be double or single, and it may be straight or have a curve at the gingivae which may be crimped to allow for expansion. Instead of the single band with the C clasp, a double band with connecting wire may be used. The double bar type of space maintainer is very popular; many dentists contend that it is impossible for the posterior banded tooth to rotate, drift, or tip under such an arrangement. The two bars are made to converge at the point where the clasp is attached.

There is also the type of retainer in which both teeth have full or three-quarter overlays and a cast dummy is soldered to the abutments. A minimum of cutting is indicated in these cases.

In conclusion, I hope that I have made these three points clear: (1) the necessity and importance of maintaining space in the deciduous dentition; (2) the results from improper or total lack of maintenance; and (3) the simplicity of an appliance which will mean a great service to the patient and which will be of some remunerative value to the practitioner.

THE PSYCHOLOGY OF HANDLING THE CHILD IN THE DENTAL OFFICE*

G. C. Turner, D.D.S., Lubbock, Texas

THE object of this paper is to appeal to the dentist to take more time in studying the nature of the children that come to his office for dental service, and to handle them in such a way that these tots not only will be good patients while they are children, but will grow up to be real friends and boosters of the dental profession. If we are ever to elevate our standing as a profession, we must do it through the children.

First of all, children are just little men and women, and are little different from their fathers and mothers. They like for you to speak to them when they enter the office and call them by name. They have that same sense of pride that their elders have when complimented on little things: for instance, promptness in keeping their appointments, care they have given their teeth since the last visit, or the tidiness of their clothes and person.

There are two types of children according to their inherited dispositions: sensory- and motor-minded, or intravert and extravert.

The sensory-minded child, or intravert, is passive, quiet, and reflective. This type seems timid and should be stimulated to talk and act. They comprise about half the children that come to the dental office and seldom give any trouble if you win their confidence to begin with. Find out what they are interested in by encouraging self-expression. Let them hold an instrument with the idea that they are helping, and usually you have a splendid patient.

Too many dentists evade the responsibility of properly caring for their young patients, because they fail to understand child psychology. Creating the proper mental attitude requires some thought, a little patience from and cooperation between the mother and the dentist. Special consideration should be given each child, and no hard and fast rules can be laid down. Dental care of children is an obligation to ourselves, the child, the parent, and the government which granted the license to practice this profession. It is to those who think they are unsuited by nature and temperament to practice for children that I appeal to spend more time and patience with children. Some dentists say they can get along with the "doll" type, but have no patience with the dirty boy who has filthy hands and a neck that is badly in need of either sandpaper or soap. Pollock says, "We must learn to speak the language of the boy, know the lingo of the baseball lot, as well as the bluff pretense and the gusto involved in the threat of the mailed fist. As to the little girls, we must learn to know and enjoy their mental processes, to appreciate their seriousness and happiness. In other words, to be child-minded,

*Read at the meeting of the Southwestern Society of Orthodontists, Abilene, Texas, October 15-17, 1934.

we must develop a fraternalism with children; their interest is wholesome and sincere.''

There are too many grown people who have a horror of the dental office because of a visit early in life, for which only the dentist is to blame.

Have you noticed that the most popular stores have departments for children? The larger department stores have whole floors for children, and play rooms equipped with every imaginable thing to play with, supervised by high-salaried women.

Take a look at the average dental office. The chairs in the reception room were all made for grown-ups. Johnny and Mary sit there with their feet dangling in the air, with not a book or magazine on the table that was published for children; not a picture on the wall that was painted for them, and not a toy to play with. Johnny's feet have ''gone to sleep'' from hanging over the edge of the chair; now he is paralyzed all over when the nurse or dentist steps to the door and in a grave, dignified manner announces, ''Next,'' and what happens in the operating room is another picture.

David Starr Jordan sets forth as his belief that ''there is nothing in all the world so important as children, nothing so interesting. If you ever expect to go in for philanthropy, do something for children, if ever you yearn to be wise, study children.''

DISCUSSION

Dr. Frank H. Harrison, Wichita Falls, Texas.—Dr. Turner has certainly given us plenty of food for thought in his most excellent paper. I do not believe there is a thing in his paper on which I could take issue with him, and the only discussion I could give on it is to enlarge a little on some of the subjects he has mentioned.

We all have patients who are shy of the dental office as some dogs are ''gun-shy.'' It is just as hard to train a child to like a dentist after once being frightened badly as it is to break a dog of being ''gun-shy,'' and this is well-nigh impossible.

There are very few rules that can be followed explicitly in our dealings with children. Each child is an individual and should be treated as such, and will then respond favorably to suggestions made by the dentist.

The easiest child to accommodate himself to our work is the one who comes in asking questions. If the parent tries to stop him from asking questions, get rid of the parent. Take a little time (it will save you time in the long run); explain to him everything he wants to know; then carry him a little farther and explain some questions he has not thought of; take the lead in the conversation, and guide his attention to the work in hand. When he is once interested, his cooperation is automatically obtained.

The next patient that comes in may be the timid sort of individual or one who has been, I think we might say, ''overtrained'' and is afraid of asking questions before his parents, or too timid and sometimes indifferent—so much so that he has no interest whatsoever in what you are going to do. This child needs very careful handling. You must be an expert salesman to get next to him. An expert salesman must first create a favorable attitude toward himself in the mind of his client. Without this first step nothing can be accomplished; sometimes the first word uttered controls whether this child will like or dislike you. The next step the salesman must make is to create an interest in the object he wants to sell. All of this applied to our work means that the dentist must sell himself first to the patient, whether it be child or adult, for as Dr. Turner has so well said, children are just little men and women. Only a few years separate them from fathers and mothers. If our personality is once sold to the patient, our service, which is a product of our personality, is an incidental item which is accomplished by our hands automatically as far as the patient is concerned while a pleasant conversation is going on between the child and the operator.

I spoke just a moment ago about the patient's first impression and the first word. As little as we think of it, not only here but everywhere, politeness and courtesy are generally appreciated by all human beings. Nine out of ten parents greet you as they come in by introducing themselves; neglecting to mention the child's name. This is your cue to create a favorable attitude in the child's mind by placing his introduction on a par with his parents'. If possible do not let him get in the chair without knowing his name so you can call it, and knowing something about him that can be discussed as he enters the operating room and gets in the chair. There is plenty of time then for examination of the teeth. By this time the little patient should have the thought that he has not come into the cold uncompromising place that is so often pictured in his mind in advance. You have created a favorable attitude in his mind toward you, in other words, you have sold yourself before attempting to sell your services.

Another type of patient is the resentful type, which I believe is the hardest type to handle. He should be treated as any other patient, and sometimes this resentfulness, which is simply a crust over an ordinary type of personality, is broken by the politeness and courtesy mentioned a little while ago; but if it is not, we must resort to several other methods. Most of the time you can find some object, some sort of sport, or some subject in which this child is interested; and if it is discussed intelligently by you, the crust is at once broken. Sometimes these children have a preconceived idea that the dentist is "dying to get hold of them" and to do this work for the dentist's own benefit. If this is the case, convince them that you are indifferent as to whether you work on them or not. If necessary, show them by your actions and at the same time explain to them it is all for their benefit and not yours; and you do not give a "whoop" whether you work on them or not. The crust is broken, and you have a complete reversal of attitude.

There are a few patients, and let me emphasize this fact, a very few, who need a little rough talk. In the absence of the parents give them to understand that you are boss, and that you will do the work if they want it done, otherwise they can climb down and get out, that you do not have time for them. In these extreme cases where this treatment is needed we sometimes get a most cooperative patient that might have been ruined for life by improper handling.

I thoroughly agree with Dr. Turner that a man's practice is built on the attitude he has toward children. A dentist cannot afford to neglect them. They are his greatest asset if he expects to be long in the practice of dentistry, and once he sells himself to the children of the community, his welfare is assured.

You can almost always tell by the appearance of the child and a little conversation with him what he lacks in his home life. If he is well cared for in a sympathetic home and has the companionship of his parents, he will show it. There is very little for you to add except to be courteous and polite on all occasions. If he needs companionship and sympathetic understanding of his problems, take a little time and supply these; he is hungry for them, and it will not only give you the much desired cooperation, but will pay you dividends that cannot be estimated in monetary terms.

The orthodontist especially has a great opportunity to do good, and from my viewpoint, is greatly blessed and benefited in the association he has with his patients.

Dr. Turner's reference to the reception room is very important, and we should all remember this and follow the example of the large commercial organizations who recognize that a favorable attitude in the children must first be obtained before favorable results can be had.

PITFALLS OF A DENTIST*

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THE dictionary tells us that a pitfall is a pit contrived for trapping wild beasts or men; hence, any hidden danger.

While some pitfalls are dug to trap men, it is my hope to make this subject so simple that no one will stumble or fall into any pit of misunderstanding or doubt. More than this, it is my sincere wish to present this subject in such a way that each may find something which will profit him and also be of benefit to our children.

We float in an ocean of perplexed uncertainty when we depend on our clinical impressions to explain the why and wherefore of facts. Theories can never excommunicate facts. Clinical experience teaches us how to recognize certain conditions and what is best to do in the circumstances that confront us. Neither clinical experience nor clinical impressions are safe compasses to guide us in making deductions, or to arrive at conclusions regarding statistical data. We should consider what is the nature of the facts presented? Have they been correctly tabulated? Was the method of their procurement reliable? Do they coincide with similar data collected elsewhere? Granted that the answers to all these questions are satisfactory and the data presented are true, what then should be our attitude in relation to them?

The reaction of men to statistical findings differs. This largely depends on their familiarity or unfamiliarity with this kind of data. Ofttimes their response will be influenced by their personal feelings toward the person presenting the information. As we cannot entirely eliminate this element in human nature, would it not be better if no author's name were attached to such articles? If this were done, we would be compelled to think through the problem for ourselves. Our conclusions would be based on our own deductions because we would be thoroughly conversant with the problems involved and the methods of securing the data. Too often do we accept the deductions of the author without making any effort to prove for ourselves their fallacy or correctness.

Even though we are reasonably confident in the honesty of the compiler, and we know he has no motive in securing specific data because he has no theory to support, we should still refrain from too quickly accepting or rejecting the facts presented. Gather some data yourself, but, first be sure you obtain your data in exactly the same way, and by the same procedure, as the data which you intend to question.

Well do I recall my reaction to the first statistical data secured. We had added together, mesial with distal liability, and buccal with lingual. The per-

*Presented before the Hartford Dental Society, Hartford, Conn., Nov. 12, 1934.

centage of liability of each group was then recorded. When I noticed that in the molars the figures showed a higher liability for the buccal and lingual surfaces than for the mesial and distal surfaces, I refused to believe it. I felt some mistakes must have been made. Later investigations, however, proved this to be the fact.

The data secured from examinations made for carious cavities with only the use of wooden depressors cannot be compared with data secured by the aid of explorers and mouth mirrors. Even the finest and sharpest of the explorers used should be recorded. This is particularly true when examining for pre-carious pits and fissures, or openings where no decay is seen. Because an explorer "catches" is not sufficient proof that an opening exists. The following description of a pre-carious pit or fissure should be accepted and used, when tabulating data on this condition so that all may have the same viewpoint and an understanding of what is referred to. "A pre-carious pit or fissure is an opening in the enamel into which the explorer sinks below the surface at the point of entrance."

The first time we reported that no carious cavities were found in the enamel of the lingual surfaces of the mandibular six anterior teeth of several thousand persons, two men came up to me after the meeting saying they had filled many such carious cavities. Their memories failed them when asked to produce one such case. Since that time we have examined the lingual surfaces of over 190,000 mandibular incisal teeth before we found the first carious cavity in the enamel.

The late Professor Stein of New York College of Dentistry told his students that our bodies are so wonderfully made that did we have the knowledge of right living our bodies should last some four hundred years or more. Undoubtedly many years will pass before mankind obtains the knowledge of right living. We have barely started to comprehend and far less to understand the influences our mental attitude plays on the health and well-being of our bodies. We recognize that worry, grief, and excitement bring about physical reaction, but we have not yet learned how, nor why, these physical results of mental conditions are produced.

Our profession is now studying the effects of different foods in the maintenance of good body functions, but the most ardent and sincere student of diet realizes that we know very little at present. There are those, however, who, carried away by the enthusiasm of the novelty of this venture into new fields of discovery, make grand and wonderful deductions which are later upset by more careful investigations.

There are many factors which we must recognize and take into consideration regarding the question of health and also of decay of the teeth. We should make a distinction between preventive dentistry and operative preventive measures. The two are not necessarily the same. "Preventive dentistry" includes the study of and the care for the expectant mother, the baby, and the growing child. It naturally includes all that comes under the head of "preventive medicine." While these terms have been loosely constructed, they should be broadly and liberally interpreted and understood.

"Preventive medicine" includes in its practice an operative measure commonly called "vaccination." Because this procedure is not 100 per cent successful, where is the physician who would proclaim that "preventive medicine" is a failure and a hoax?

It is not past belief that in the early days when vaccination was first introduced there were many physicians impatient for the "final day" when they might deal with the "absolute all" with a predetermined finality. They no doubt claimed that the term "preventive medicine" is "unattested" and is based on "a false hypothesis and is a negation in concept." And with what results? That many physicians refrained from the practice of prevention, and thousands of persons who could have been saved were allowed to die or become disfigured for life.

However, the few who had faith, courage, and optimism carried on, and today no one would call preventive medicine "a failure and a hoax" or that it is "a false hypothesis and a negation in concept."

Carefully compiled dental statistics should and undoubtedly will be of great assistance to us, first, in suggesting further lines of investigations, and second, in showing us the locations on the teeth where operative preventive measures can be successfully applied.

Frankly, when I first started to collect dental statistics, the facts secured confounded what I had fondly believed to be the truth. And these conditions which I thought were true were those that were generally accepted by my friends, for they were generally accepted by all. It was our belief that approximal caries was the most prevalent, and as a proof that this was the common belief in those days, illustrations to show where decay generally started, always showed it on the mesial and distal surfaces. When Dr. Robert Arthur in 1867 suggested cutting or slicing the approximal surfaces to prevent decay of these surfaces, it became the accepted procedure. The fallacy of this procedure rested on three facts: first, the proximal surfaces do not have the greatest liability; second, in the procedure advocated by Dr. Arthur no provision was made for the replacement of lost tooth substance, by material not affected by bacterial acids; and third, the shape produced increased the opportunity for the retention of food débris.

It has been stated on good authority* that we do not realize how little decay is needed at the dentoenamel junction to affect the pulp. This being true, we cannot tell to what extent the presence of decay at the bottom of a buccal pit or occlusal fissure at the dentoenamel junction lessens the resistance of the whole tooth and at the same time increases the susceptibility of the surfaces which are exposed to unfavorable environments, such as the environments between the teeth.

The more we study the shape or form of the tooth, the better we shall understand the importance of the shape in its relation to the liability to decay. That shape or form that makes more difficult the self-cleansing of the tooth increases its liability to caries. That shape or form that makes the self-cleans-

*Bodecker: Dental Cosmos 66: October, 1924.

ing or artificial cleansing of the teeth easier necessarily decreases the liability of that tooth to decay.

One of the pitfalls of the dentist is his lack of knowledge regarding the importance of the shape of the external surfaces of the teeth and the relation of these shapes with the possibilities and the probabilities of decay. The dental student is carefully instructed how to prepare the shape and form of cavities to be filled. He knows and understands the significance of what constitutes the "retentive forms." Would that he knew and understood the importance of the "cleansing form" of the external surfaces as thoroughly and as well as he does the retentive form of the inside surfaces. If he knew this, he would possess the knowledge that will enable him to recognize at once the possibilities of operative preventive measures. He will know where are the hidden dangers. He will no longer float in an ocean of perplexed uncertainty, because, having studied statistical facts interpreted with mathematical accuracy, he will know what constitutes the greater or lesser liability of external surfaces, and he will not neglect the pitfalls nor overlook the hidden dangers.

The time is not far distant when it will little avail the dentist to tell his patient how surprised he is on opening a small hole to find a large carious cavity. The patient will know that if the dentist had had the patient's best interest at heart he would have made every little hole no hole before decay could start, particularly when he learns that the mathematical probabilities are 2,000 to 1 that every little hole will decay, and that the decay will not spread on surface but will extend along the dentoenamel junction unseen and unsuspected by the patient.

It is important to understand that pre-carious pits or fissures are holes or openings in which decay has not yet started. To apply operative preventive measures necessitates the operation being done before decay will start. By taking time by the forelock and filling these pre-carious pits and fissures, we destroy their usefulness as traps, and they can then no longer serve as pitfalls in which bacteria can produce those acids which break down the teeth.

Some claim that keeping the teeth clean is not Nature's method of preserving the teeth. They little understand Nature. Keeping the teeth clean is Nature's law for the preservation of the teeth. "Clean as a hound's tooth" is no idle statement. Animals living the natural life on foods that Nature provides, have no need for special brands of vitamins A, B, C, D, and E, or sunkist oranges and tomatoes. The teeth have the cleansing form in harmony with the cleansing properties of the foods which are eaten. We can justly claim that brushing the hair is not Nature's way, nor the use of soap in washing. We can, however, recognize that Nature's law for the preservation of the teeth is cleanliness. It may interest you to know that for thousands of years little birds have helped the crocodiles keep their teeth clean. After the crocodile has finished his meal, he goes to the side of the river and opens his jaws wide. Little birds, called Jig Jag birds, settle in the crocodile's mouth and pick out the food from between the teeth.

Our enthusiastic believers in dietary reforms should not ignore the importance of the soft tissues of the mouth, nor the local points of liability found in

surfaces of the teeth, such as pits and fissures. It is seldom that we find in articles on diet any reference to the desirability of securing operative treatment for defective teeth. They should also remember that the hygienic condition of this mixing chamber for our foods is just as important as is the cleanliness of all foods before they are taken into the mouth. Therefore, let us not neglect Nature's law of cleanliness as the most simple and practical means at present for the prevention of decay, while we are studying and investigating all other factors as well as the importance of diet.

THE ECONOMIC VALUE OF PREVENTIVE DENTISTRY

WILLIAM A. GARRETT, D.D.S., ATLANTA, GA.

HEALTH should be the most important interest of every one. Fame, riches, everything in life considered valuable is worth very little unless accompanied by good health. When this truth is realized by the laity, another great stride will have been made in preventive dentistry and medicine. If you are not sure that your health is as good as it might be, make an earnest effort to improve it. Obtain the advice of your dentist and physician at once. Then follow their advice.

In discussing the economic value of preventive dentistry, we shall first try to understand just what is meant by preventive dentistry, then the economic value will be readily appreciated.

Childhood, the lovely age when character building is started, is the age in which to encourage preventive measures and to instill those habits which insure healthful and happy lives. Prevention in dental education must start prior to the birth of the child if we are to accomplish the ideal, which is two perfect sets of teeth. The deciduous teeth start to form about the beginning of the fifth month of fetal life, and the first permanent teeth begin to form about the seventh month of fetal life; although these permanent teeth do not erupt until the child is about six years of age. Expectant mothers must understand how important is the selection of a proper diet for bone and tooth building. They must consult their physician and follow his advice. Most mothers do not know that the crowns of all the twenty deciduous teeth and also the crowns of the first permanent molars are formed at birth. If the mother's diet has been correct, then these teeth will be normal at birth.

During the first year of life the child depends to a large extent upon milk for his food. If breast feeding is not possible, then the physician should prescribe a formula for the use of modified cow's milk. However, prepared foods should never be given a child except under the physician's directions. There are many prepared foods on the market which are not bone builders; therefore, the mother cannot be too careful about quality of the food.

The child who has not been given the proper foods may appear perfectly well until about the second year; when it becomes evident that the bones and teeth are not strong. Rickets may develop, but more often the teeth show this lack of bone and tooth building foods. The enamel crumbles away, leaving a soft yellow tooth structure. The conditions often develop as early as eighteen months. When that condition occurs, there is nothing to do but fill cavities, and sometimes extract the teeth, which entails a chain of distressing circumstances. Granting that the diet has been supervised by the physician, it is imperative that the children be taken to their dentist by the time they reach their second year. In this way bad habits which have worked detrimental effects on teeth and health,

such as thumb-sucking, tongue and lip habits, may be detected, and if corrected early, countless cases of malocclusion with its many harmful sequela will be prevented.

Many mothers follow the diet of the two-year-old child into the third and fourth year. The child is growing and his system requires a change if the best results are to be obtained. The diet should consist of a plentiful amount of green vegetables, eggs, milk, meat and fish, fruits, and wholewheat and rye breads. These foods should not be in too soft form, but should require thorough mastication to develop the jaws.

Visits to the dentist should be made every two or three months; at these visits the child should be instructed how to brush and care for his teeth; and if small pit and fissure cavities do develop, they should be filled as soon as they appear. The deciduous teeth have usually erupted by the time the child is three years old. After the completion of the eruption of the deciduous teeth, about three years elapse before the first permanent molars, commonly called "sixth year molars," appear. These four molars erupt posterior to all the deciduous teeth and before any of the latter are shed. The fact that the first permanent teeth which appear are not the front teeth, as is the case with the deciduous, but back ones, linked with the common belief that deciduous teeth need no care, is the cause of the frequent loss of or serious defects found in the first permanent molars.

Other misconceptions are that the deciduous teeth have no roots and that it is perfectly natural for them to decay. The truth is that these teeth do have perfectly formed roots, and rather than disappearing by decay of the crowns when their time is up, they should be pushed out by the permanent teeth and their roots absorbed by the blood. If the deciduous tooth decays to the extent that the pulp dies, the resorption of the root practically ceases, and the permanent tooth will push in beside the deciduous tooth, coming through the gum out of line. This is also a cause of permanent teeth being impacted in the jaws; with the sequence of disturbances that often follow.

Early loss or breaking down of the last deciduous molar often allows the first permanent molar to tip forward; this disturbs the occlusal relation of all the maxillary and mandibular teeth, which is a cause of irregular teeth and a common cause of periodontoclasia, or so-called pyorrhea.

Referring again to the necessity of the child's thoroughly masticating its food, lack of sufficient chewing and grinding force exerted on the baby jaws retards the development of the jaws for the reception of the permanent teeth. Obviously, then, we should consider foods which require considerable masticatory force. The permanent anterior teeth are about one-third broader than the deciduous teeth which they replace; therefore, these little jaws must be stimulated to proper development. When the child is six years of age, all the permanent teeth are in the jaws awaiting their turn to take their proper position in the arches. Consider then that all mastication is done for the first six years with deciduous teeth; that decay or loss of any of these teeth means impaired masticating ability which results in insufficient development of the permanent teeth.

Decay also means infection, and, if it progresses too far, alveolar abscesses follow as a result of the death of the pulp, which is commonly called the nerve.

This condition has far reaching complications. Dr. Charles H. Mayo has said that 80 per cent of all children's diseases arise in the mouth, nose, and throat, and that 90 per cent of all deaths occur as a result of diseases that arise in this area, or of the development of diseases in other parts of the body having the oral or nasal cavities as the original focus of infection.

I have dwelt upon these phases of the subject because they are the chief factors if we would prevent and they are not the result of willful neglect but are due rather to a lack of information.

What does all this mean from an economic standpoint? Care of the teeth is essential to health; health is essential to a life of efficiency. From the dollars-and-cents economy of preventive dentistry, no testimony could be more striking or important than the report from Professor Willis A. Sutton, Superintendent of Atlanta Schools.

Is not the evidence that such a reduction in retardation and expense incurred in the city in the face of many unfavorable conditions a logical and effective basis on which to appeal to the public for cooperation in *prevention?*

It has been generally conceded that the condition of the teeth of an individual is responsible or contributory in a large measure for the general health, whether this be by aiding mastication or by eliminating force of infection. This is certainly true of both adults and children. There can be no doubt that dental ills affect the health of the child, as cavities causing pain, preventing proper mastication, nervous reflexes or focal infection, retard its growth and development, and have a direct influence on its physical welfare, mental development, and progress in school.

Department of Orthodontic Abstracts and Reviews

Edited by

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Clinical Pathology of the Jaws. (With a Histologic and Roentgen Study of Practical Cases.) By Kurt H. Thoma, D.M.D., 643 pages, 423 figures, and 8 color plates, 1934, Baltimore, Charles C. Thomas.

The first chapter of the book is the most interesting one from the standpoint of the orthodontist. It is entitled "Malformations of the Head, Face, and Jaws," and it contains several subdivisions which take up the different types of deformities according to their etiology. Here belong the deformities of the jaws which are caused by abnormal development, such as harelip, cleft palate, macrognathia and micrognathia, malocclusions, and the congenital absence of teeth. In adherence to the etiologic viewpoint, which is followed throughout the presentation, Dr. Korkhaus's classification of malocclusions is used, which is somewhat similar to that of Kantorowicz.*

Then local conditions causing abnormal development of the jaws are discussed. They relate to feeding methods and to those habits which interfere with the physiologic functioning of the jaws. Stallard's work on sleeping habits is cited, Schwarz's work on the carriage of the head, and the experiments of Wankewicz who produced a protrusion of the jaws by injecting paraffin into the tongues of dogs.

Among the general diseases which cause malformation of the jaws there are imperfect bone formation, dwarfism, creatinism, and gigantism. An atrophy of the jaw bone may occur through pressure, disuse, senility, or neurotrophic changes.

Fractures of the maxilla and the mandible are differentiated into pathologic fractures (in which the fragility of the bone is caused by pathologic conditions, tumors, etc.), and fractures due to trauma.

One chapter is devoted to infections of the jaws and their adjacent bones (sinuses). It covers a wide field because mandible and maxilla are "exposed to infection more frequently than any other bone in the body." Infections are distinguished according to their source (hematogenous or odontogenic); according to their location (periostitis, osteitis, osteomyelitis); according to their duration (acute and chronic); and according to their etiology (tuberculosis, syphilis, etc.). All these types receive a thorough description of their pathology, clinical symptoms, roentgen findings, therapy and its results. A series of instructive case reports is added to each group.

*Internat. J. Ortho. 20: 835, 1934.

The orthodontist's special attention is again aroused by the section on endocrine disturbances. After some introductory remarks showing the general relations of the various glands, these are considered individually, namely, the thyroid gland, the parathyroids, the thymus gland, and the hypophysis cerebri (pituitary gland). Some very pertinent data are given on acromegaly, osteitis fibrosa, and bone osteoporosis. The effects of nutritional disbalance (avitaminosis, calcium phosphorus metabolism, etc.) are demonstrated in cases of scurvy, rickets, and osteomalacia. Some rare diseases of uncertain etiology are found in Paget's disease (osteitis deformans) and leontiasis.

There are well rounded-out chapters on cysts, benign tumors, and oral neoplasms.

Dr. Thoma's book is an outstanding contribution to dental literature. There is hardly a phase in jaw pathology which is not covered thoroughly and authoritatively. An unusual feature is presented by the abundant case histories, which will appeal to all those whose inclinations lean toward the clinical and practical aspects of dentistry. More than 400 splendid illustrations accompany the text, among them some very fine reproductions of x-ray pictures. An appendix includes the principles of routine laboratory staining. The completeness and systematic arrangement make this volume an ideal reference book. This purpose is aided by an exhaustive table of contents, an index of the text, a separate index of case histories, and a most comprehensive bibliography of American and foreign literature, which is appended to each chapter. Cover, paper, and print of the volume are of the finest quality.

E. N.

Calcification of the Pulp After Trauma. Abstracted from: Über Dentifikation nach Traumen, by Dr. Wenzel. Deutsche Zahnaerztliche Wochenschrift, December, 1934.

It is a well-known fact that pulps have a tendency to calcify with advancing years. The pulp chamber then disappears entirely and is filled with dentin. These conditions are so frequently found in senile dentitions that they may almost be called physiologic. They are present in all or, at least, in several teeth of one mouth.

Calcifications, however, which are due to a traumatic injury involve rarely more than one tooth. They are found in comparatively young people. In all the cases examined, anterior teeth were involved, but the possibility of similar happenings on the premolars should not be discounted.

Calcifying changes in the pulp tissue apparently occur quite rapidly. The canals of the maxillary central incisors of a young girl (aged twelve years) were found to be almost entirely obliterated after one and three-quarters years following the trauma. In some instances, the calcification is not detected until much later, and the traumatic etiology is then not evident.

It is undetermined why in one case degeneration and necrosis of the pulp set in under acute inflammatory reaction (and this is, as we know, the most frequent result), while in another case the youthful pulp is stimulated to a regenerative activity which ends up with the obliteration of the pulp canal. In

all probability, several factors are deciding the type of reaction which sets in, namely, the intensity of the trauma, the direction of the force, and the immediate effect of the injury upon the tooth and the periodontal structures.

The diagnosis of a calcified pulp can frequently be made by the change of the normal tooth color to yellow. Furthermore, the thermal and electrical pulp tests are negative. The x-ray examination shows the more or less complete elimination of the pulp canal. It is inadvisable to drill into such a tooth for the purpose of root canal filling. Even if remnants of the original canal appear present in the apical part of the root, secondary inflammation of such rudimentary pulp canals are infrequent. This is also probably the reason why pulp calcifications have not more frequently been detected and described.

E. N.

The Forum

Articles for this department should be sent to Dr. Albert H. Ketcham and Dr. William R. Humphrey, 1232 Republic Bldg., Denver, Colo.

The Orthodontist's Fees and Service

Several articles have appeared in the Forum concerning fees for orthodontic services. It might give us a little different outlook on orthodontic fees if we were to consider the services rendered by medical men as compared to the service rendered by orthodontists and then make a comparison of the fees. Consider the many years' treatment necessary to correct a deformity of the long bones, coupled with orthopedic physicians' fees, and repeated hospital and nurses' bills, and this deformity usually is no more injurious to the child's health and appearance than is a bad case of malocclusion, with associated facial deformity. One might compare the expenditures for training in a preparatory or military school with those for orthodontia. Quite often the fees for a year's training run well over $2,000, and the average is over $100 per month, or $1,200 for the school term of eight or nine months. Of course, training in one of these schools is of value to a boy; so, too, are the years spent by a young girl in a girls' boarding school, but comparable training can be obtained in the public school system, and there is no offset or compensation for the loss of orthodontic treatment for which we charge a trifling fee compared to the expenses just mentioned.

In the correction of a serious malocclusion not only should we count the cost of treatment, as represented in overhead, interest on money invested in our education, and office equipment, all in preparation to practice, but we also should visualize the benefits which the child may derive from the treatment. Surely the correction of a dentofacial deformity is one of the greatest services which can be rendered.

We believe that those well able to pay a fee should fully reimburse the orthodontist for his time, experience, and knowledge; those in moderate circumstances should pay enough to leave the orthodontist something above overhead expenses, while those who are badly in need of our services but who cannot afford to pay a fee which more than covers our overhead expenses should be treated on a cost basis. One should carefully select the cases in the latter class of patients suffering serious deformity, for the number one can treat is naturally limited. The experience gained through treating such cases will, however, help the operator to treat difficult malocclusions more skillfully, and thus his services will command a more adequate fee from those who are able to pay.

The fee should be arranged to cover not only the active period of treatment but also the postoperative, which may extend even until the third molars are in position or have been removed. Roentgenographic examination should be made

at least once each year during the periods of active treatment and of supervision. Likewise, if changes in occlusion occur during the latter period, study casts should be made. If not, a memorandum should be made of the condition at the time of each examination.

Many orthodontists seem to have but little interest in their cases after the first period of active treatment. One reason is that they lack the experience and courage to inform parents that postoperative supervision is necessary; therefore, they do not charge fees sufficient to permit such supervision and at the same time afford the orthodontist a living. Such a sketchy service as rendered by those orthodontists is worth no more than the fee they charge, which, though low, often is much too high for the service rendered.

How much better is the plan first to make a thorough diagnosis from models and roentgenograms which possess diagnostic quality, to study the patient's facial disharmonies; also to investigate carefully the physical condition, usually with the aid of a pediatrician, remembering that the orthodontist must be much more than an expert maker and adjuster of appliances, for he is working in the realm of biophysics. After the diagnosis is completed, explain so far as possible the results of the diagnosis without bringing up the subject of the pet "efficient" appliances to be used; speak of the average time, both active and follow-up, required to treat a case presenting similar deformities. Then name a fee on a yearly basis, which is fair to the operator and to the patient in question.

Having performed this duty and accepted the responsibility of treating the case, make a determined effort to place all the teeth in occlusion, i.e., each tooth in correct relation to its neighbors in the same dental arch and in correct occlusal relation to the teeth in the opposing dental arch. Then follow the case through to a successful completion.

A. H. K. and *W. R. H.*

A Letter to the Forum

Dear Dr. Ketcham and Dr. Humphrey:

Since recently completing the postgraduate course in orthodontia of the Harvard University Dental School and adding orthodontic service to my general practice, I discovered from my limited experience that the majority of people do not even know the meaning of the word "orthodontist." This is true even of highly educated and intelligent people. This fact has revealed itself emphatically from daily questions asked me by patients as to what the little sign "Orthodontist" signifies.

Some readers might possibly infer from the above statement that I cater to an ignorant class of people in some remote, unprogressive locality. In this case, however, the contrary is true. The practice here consists of people of average education in a thickly settled suburb in the cultural city of Boston. Using this experience as an index, it is reasonable to assume that public ignorance of orthodontia is probably fairly general. It cannot be denied, however, that many people do know the phrase "teeth straightening" or have heard something about that service. Nevertheless, the fact remains that to the average person the term "orthodontist" is an unfamiliar noun. It is also apparent that

many patients are of the opinion that "teeth straightening" is a luxury, and they have an exaggerated idea about fees charged and accordingly assume it to be within reach of only the wealthy.

It is an admitted fact that the meaning and type of service a physician, dentist, druggist, optometrist, etc., render are well known to every one; but I repeat (for emphasis) that to the majority of people "orthodontist" and "orthodontia" are strange words.

I believe that even many general practitioners of dentistry do not fully appreciate the benefits of orthodontia. This is based on the fact that so many cases of malocclusion are allowed to go untreated or unreferred. Some dentists, in fact, have a distinctly hostile attitude because they have seen some orthodontic failures; but these very men are not ready to discard denture service or root canal therapy merely because some cases have failed in their practice.

Thus it appears that orthodontia needs to be "sold" to the public as well as to some dentists. If there was as little known or appreciated about any other profession, I am sure that the constituency would do something about it. I have no specific remedies or suggestions to offer, except to call attention to the great necessity for public education as to the value and benefits of orthodontia as a health service.

Sidney P. Stone.

COMMENT

The above article by Dr. Sidney P. Stone in regard to lay education is particularly interesting. The nature of the community has little to do with the public's knowledge of medicine, dentistry, or orthodontia. If most of the people living in a community are to become familiar with the benefits of orthodontic treatment, they must be educated by the orthodontist.

The condition of which Dr. Stone speaks as existing in Dorchester, Mass., once existed generally. There are communities, however, in which the proportion of practicing orthodontists to population is high, or in which men have engaged in the exclusive practice of orthodontics for many years and the benefits of orthodontic treatment are much more generally understood, particularly among the educated people.

At present, many methods are being used to acquaint the layman better with medical and dental facts. *Hygeia,* the medical magazine for the laity, published by the American Medical Association, is one method. Speeches given before lay audiences such as parent-teachers' associations and women's clubs are another. Radio broadcasting offers one of the best means of educating the public. The University of California sponsors a series of radio programs. Dentistry is given a place in these broadcasts, and, periodically, discussions of different dental subjects are broadcast. The articles on orthodontia are written by an orthodontist but are broadcast by some one in general practice or specializing in some other branch of dentistry, and vice versa.

Dr. James McCoy of Los Angeles has taken an active part in preparing material for orthodontic programs for these broadcasts, and the material may be used by other organizations.

This problem of lay education in orthodontics is one which has been neglected, and no doubt much good can be accomplished by further study of the problem.

W. R. H.

More About Identical Twins

In the November, 1934, issue of the INTERNATIONAL JOURNAL OF ORTHODONTIA AND DENTISTRY FOR CHILDREN, there appeared in the Forum a communication taking exception to the title of my article, "Cleft Palate Found in Only One of Identical Twins."

The patient was treated by a St. Louis orthodontist for ten years and then because of a chance in his educational program was referred to me (in Philadelphia). The preliminary history was furnished by those who had had him in charge. Because of the high professional standing of those who took the history, its authenticity was never questioned.

Unfortunately, it will be impossible for me to answer Dr. Waldo's questions with regard to the physician's examination of the placenta and the chorionic and amniotic membranes, because such proof has not been available. Because of the insistence of the attending physician that the twins, according to his examination, were identical, even though modern scientific demands for such proof are unsatisfied, I have labored on the assumption which I incorporated in my report. Since all assumptions are debatable, it must remain so within the minds of those who will not accept it as such.

I have not tried to present an original claim, but because of the unusual interest embodied in this report I have allowed it to be published. At this writing I should like to quote from Herbst and Apffelstaedt in their 1930 edition of *Malformations of the Jaws and Teeth*, pp. 131, 132.

"The significance of double formations in the pathogenesis of clefts of arrest lies in the following facts:

"(a) Since a bilateral cleft of the lip and jaw may be present in both of twins, the cause is presumably either pure heredity, abnormality in the germ, or a fault in fertilization. At all events the cause must lie in the germ, for the twins are uniovular.

"(b) Since clefts of the lip may occur on the right side in one twin and on the left in the other, the primary cause must be an inherited disposition to cleavage, while the position of the cleft must be due to intrauterine influences.

"(c) Since clefts of the lip and jaw may occur in one twin only while the face of the other is normal, heredity must be eliminated, and the defect can only have been acquired in utero. It follows from these facts that a great number of clefts of the jaw, depending only upon arrest, may occur without any hereditary influence, but that heredity, abnormality of the germ, and abnormal fertilization must be taken into account as causal factors."

I wish to extend my thanks to Dr. Waldo for his interesting communication.

Harry B. Wright.

Recent Galvanic Tests With Chrome Alloy and Dissimilar Metals in the Mouth

In a paper,* by Bernard L. Hyams, Montreal, Canada, an interesting series of tests on the electrogalvanic compatability of various metals used in dentistry and orthodontia was described.

The comparative table showed the lowest galvanic action where stainless steel was one of the metals or alloys, but stainless steel was tested in only two cases.

These results suggested a more comprehensive test in which stainless steel would be more in evidence. Such a test has been run on fifty children who have chrome alloy (U.S.S. 18-8 stainless steel) appliances in their mouths, plus various filling materials. The test was run with a jewel microameter, using large copper lead wires.

The following table shows the findings in fourteen average cases, which includes the highest readings and the lowest readings recorded in the 50 cases.

TABLE SHOWING GALVANIC ACTION, IN MICROAMPERES

CASE NO.	AMALGAM TO AMALGAM	AMALGAM TO GOLD	AMALGAM TO COPPER	AMALGAM TO CHROME ALLOY	GOLD TO COPPER	GOLD TO GOLD	GOLD TO CHROME ALLOY	CHROME ALLOY TO COPPER	CHROME ALLOY TO CHROME ALLOY
I	3	4		2		2	1		1
II	5	10	15	2	20	7	5	7	2
III	1	1		0		0	0		0
IV	1			1					1
V	2			1					2
VI						3	2		3
VII	0	0		0			0		0
VIII	3			4		4	1		2
IX	2	3		1		3	2		1
X	7	5		5		3	2		2
XI	3			2					2
XII	5	4	6	4	5	4	2	5	4
XIII	4	5		3		3	2		1
XIV	3	4		1		3	2		2

The tissue tone of all mouths was exceptionally good, and practically all had a slight alkaline reaction.

There is a noticeably low galvanic action in every case in which chrome alloy is one of the metals. A summary of the results shows that chrome alloy produces the least action of all the metals and alloys tested—the materials commonly used in orthodontia and dentistry.

J. Lyndon Carman.

*Electrogalvanic Compatibility of Orthodontic Materials, INTERNAT. J. ORTHO. **19**: 883, 1933.

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Editorial

Progress and Change

MUCH is being written and a great deal is being said from week to week in regard to the rapid changes which are taking place in every industry and, in fact, in every walk of life during these interesting times. Probably nowhere is there such fast action, such rapid shifting of pace as in the automotive field, which is an outstanding phase of life at the present time and exemplifies the shifting of habits at its very height.

So rapid is its change that the onlooker is left confused; nevertheless, he admires and stands aghast at the courage and initiative manifested by its leaders in bringing about such rapid changes and improvements from month to month.

Change is not new—it has always been thus; however, the pace is now faster. In 1850, hordes of sturdy pioneers crossed the great American plains from the

Middle West to California by wagon train. They were looking for something new, something unheard of. They were in search of treasure, and the trip took many weeks of effort and entailed great hardships. Only fifty-four years later, Death Valley Scotty on a specially chartered Santa Fe train astonished the nation when he thundered across deserts, over the Rocky Mountains, climbed the Continental Divide, and fairly catapulted himself from Los Angeles to Chicago in the unprecedented time of forty-three hours. That was faster than man had ever ridden previously. This feat made the front page throughout the world; that was in the year 1904. It is interesting, however, in contrast now in 1935 to realize that commercial flying planes operate on regular schedule over this same route in barely sixteen hours. This change has taken place in the short space of one generation.

There has had to be an inspiration, an urge, in order to make such changes possible, and this urge resulted from the dreams and plans of a few men who step by step solved the complex problems of transportation.

There have been changes in orthodontic treatment during even a shorter period than one generation, not so spectacular or colorful perhaps as the shift of transportation from the wagon train to the airplanes; nevertheless, the change has been rapid and is still occurring day by day, probably more rapidly now than at any time during the entire previous history of orthodontia. About the time Death Valley Scotty crossed the Mohave Desert at breakneck speed, men were correcting malocclusion and doing it fairly well, using 16-gauge brass arch wires and tying the teeth to the wires with unsanitary and unclean ligatures, or they were using a removable crib constructed mostly of zinc and tin; and the American Society of Orthodontists was just in its beginning. Many believe that the practice of orthodontia is even now only an infant in arms. Its record has been spectacular and praiseworthy; however, it is obvious that great advancement will be made in the near future.

Orthodontic practice can be immensely extended and improved by making visits necessary for treatment at longer intervals; it can be improved by cutting down the time of active treatment and by simplifying, modifying, and designing appliances for greater accuracy and efficiency in order that they may work longer without attention; it can be improved by getting the biological concept of the subject as contrasted to the viewpoint of the mechanical and stress and resistance. Burbank discovered some fundamental laws that run all through nature and biology which may be applied in a measure to orthodontic problems; for instance, a plant that grows in the desert, like the cactus, is not equipped with wide delicate exposed leaves to dry out from the hot sun and the rarified dry atmosphere which would release its moisture—these plants have hard, tough spines for leaves. The banana tree growing in the tropics where it is exposed to much rain and moisture has wide broad leaves which catch and store the water. The banana tree could not live on the desert, and the desert plant could not live in the environment of the banana tree. These plants are adapted to their own environment. The human body is quick to adapt itself to environment. If an indoor worker is exposed to the hot sun and winds of the desert or to the cold of the Arctic for twenty-four hours a day, after the first shock he will soon

develop a skin almost double in thickness, tanned and bronzed like the American Indian. Teeth and jaws are subject to adaptation, both of environment and of good habits; Rogers has proved this in his experiments. The possibilities for improvement in orthodontia are infinite. Changes will be brought about by those who are sufficiently progressive to take inventory of the progress which has been made in orthodontia in the past, to select the good and reject the bad, and to add to this knowledge bit by bit in the same way improvement and progress have been made in scientific medicine, in transportation, or in any other field.

Progress is being made—there are reports of cases treated successfully in four to fifteen visits of the patient to the orthodontist, between the time the appliances are fixed in place and the time for retention. The orthodontist makes no claim for these as "completed" cases but has cut down the so-called active treatment time to about airplane schedule tempo. That is important because the "major movement" in orthodontic treatment is the active period of treatment. The retention period is important; however, it may often be dispatched and may be checked at rather long intervals by the experienced and skillful operator.

Greater dispatch in treatment is on its way, and those who contribute in this work will add a practical, workable, everyday advancement to the specialty that is much needed. This will no doubt come as a shorter period of active treatment, but not a shorter period of observation.

Important strides are being reported even in the treatment of adult cases. Some orthodontists are treating cases in which they make no pretense of securing ideal results; however, they have many times accomplished highly creditable orthodontic improvement esthetically and occlusally by careful treatment. Orthodontists for the most part have been slow to come forward with case histories reporting short duration of treatment because the question necessarily always arises as to when is active treatment not active treatment; and, when it is not active treatment, what kind of treatment is it? The dividing line between active treatment and observation is highly indefinite.

The question of the duration of time of orthodontic treatment has been not only abused but also misunderstood. Many an orthodontist is given credit for treating a case for five years when perhaps the actual active treatment was not more than five months to one year; in fact, the orthodontist may have seen the patient only occasionally for a check-up or for supervision. For this he always gets credit for a long period of treatment whether he deserves it or not. Protracted treatment of cases, or what is facetiously referred to as "perpetual care," has been passing for some time. Orthodontic treatment is being better understood and is being dispatched more quickly; defects in treatment are being remedied; and he who advances most in the next decade will investigate all major movements in orthodontic practice, reject the bad and retain the good; and by this time-honored method rapid strides will be made in the efficacy and dispatch of orthodontic treatment. All orthodontists should work toward this end, to the advancement of a struggling but highly meritorious profession.

H. C. P.

News and Notes

American Society of Orthodontists

The thirty-third annual meeting of the American Society of Orthodontists will be held in New York, April 30, May 1-3, at the Waldorf-Astoria Hotel. Members of the dental and medical professions are invited to attend.

L. M. WAUGH, President,
576 Fifth Avenue,
New York, N. Y.

CLAUDE R. WOOD, Sec'y-Treas.,
Medical Arts Bldg.,
Knoxville, Tenn.

The American Board of Orthodontia

Created by the American Society of Orthodontists, 1929. Incorporated, January, 1930, State of Illinois, U. S. A.

A meeting of the American Board of Orthodontia will be held at the Waldorf-Astoria Hotel, New York, on April 29.

Those orthodontists who desire to qualify for a certificate from the Board should secure the necessary application form from the secretary. The application must be returned to the secretary, together with any other required credentials, at least sixty days prior to date of examination. In order to expedite the examinations the secretary will designate the hour at which the applicant may appear before the Board. Applications filed at the time of Board meeting will have preliminary consideration, so that applicant may be advised of work required for his subsequent examination.

Attention is called to the following resolutions adopted by the Board:

Any person desiring to make application to the Board for a certificate shall have been in the exclusive practice of orthodontia for a period of not less than five years or an equivalent to be determined by the Board and based upon the following conditions:

First. An instructor in orthodontia in a school satisfactory to the Board.

Second. An associate in the office of an orthodontist whose standing is satisfactory to the Board.

It is, however, to be understood definitely that any person at the time of making application for a certificate shall be in the exclusive practice of orthodontia in his own name.

A luncheon or dinner meeting of those orthodontists who have received the certificate of the American Board of Orthodontia will be held some time during the meeting of the American Society of Orthodontists. Members will be notified of the time and place.

ALBERT H. KETCHAM, President,
Republic Building,
Denver, Colorado.

OREN A. OLIVER, Secretary,
Medical Arts Building,
Nashville, Tennessee.

New York Society of Orthodontists

The fourteenth annual meeting of the New York Society of Orthodontists will be held in conjunction with the meeting of the American Society of Orthodontists at the Waldorf-Astoria Hotel, New York, April 30 to May 3.

A business session for the election of officers, etc., will be held Thursday, May 2, at a luncheon.

FREDERIC T. MURLLESS, JR., President,
43 Farmington Ave.,
Hartford, Conn.

FRANKLIN A. SQUIRES, Secretary-Treasurer,
Medical Centre,
White Plains, N. Y.

Thomas P. Hinman Midwinter Clinic

The Thomas P. Hinman Midwinter Clinic will hold its annual meeting March 18 and 19 at the Biltmore Hotel, Atlanta, Ga.

JOSEPH D. OSBORNE, Sec'y-Treas.,
Doctors Building,
Atlanta, Ga.

Dental Society of the State of New York

The Society will hold its Sixty-Seventh Annual Meeting June 12-15, 1935, at Saranac Inn, Upper Saranac, N. Y.

A cordial invitation is extended to all ethical dentists to attend the sessions.

DR. AUGUSTAVE NEUBER, President
619 Union Street,
Schenectady, N. Y.

DR. A. P. BURKHART, Secretary
57 E. Genesee Street,
Auburn, N. Y.

European Orthodontic Society

The European Orthodontic Society will hold its meeting at the Langham Hotel, London, W. 1, on July 29 and 30, 1935, with Dr. Sheldon Friel as its President. Many eminent European orthodontists have signified their intention of being present and reading papers or giving clinics and demonstrations. They look forward to a very interesting meeting, as there is a marked and growing desire to acquire knowledge of this fascinating subject.

The meeting will be immediately followed by the annual meeting of the American Dental Society of Europe, and it is expected the attendance will be a large one. Doubtless, when the final arrangements are made, there will be an exchange of hospitalities between the two societies, which was the arrangement of the last meeting at Scheveningen, The Hague, in May, 1934.

The European Orthodontic Society, by invitation from the Secretary, Mr. G. F. Cale-Matthews, is very eager that co-patriots of America attend this meeting and contribute to the program.

The officers of the European Orthodontic Society at the present time are as follows: President, E. Sheldon Friel, Dublin; Vice President, H. E. March, Bexhill, England; Secretary, G. F. Cale-Matthews, London; Editor and Treasurer, O. Henry, London. Board of Censors: J. T. Quintero, Lyon; F. Stuhl, Paris; E. D. Barrows, London.

Southern Society of Orthodontists

The fourteenth annual meeting of the Southern Society of Orthodontists will be held at the Signal Mountain Hotel, Chattanooga, Tenn., on September 30, October 1 and 2.

Members of the dental and medical professions are cordially invited.

WINSTON P. CAINE, President,
Medical Arts Building,
Chattanooga, Tenn.

WILLIAM P. WOOD, JR., Secretary,
442 W. Lafayette Street,
Tampa, Florida.

The British Society for the Study of Orthodontics

The British Society for the Study of Orthodontics, Manson House, 26, Portland Place, W. 1, will hold the following meetings according to its program in 1935:

Jan. 14 —Presidential Address: Mr. A. L. Packham.
Communication: Mr. J. H. Hovell, "Some Cases of Inherited Dental Abnormalities."

Feb. 4 —Paper: Dr. G. Northcroft, "A Short Communication on a Proposed Framework for the Arrangement of a Collection of Examples of Abnormalities in the Positions of Teeth." (Accompanied by lantern slides.)
Discussion to be opened by Sir Norman Bennett.
Communication: Mrs. E. M. Johnson, "An Unusual Case of Apparent Prenormal Occlusion."

March 4—Paper: Professor A. F. Lundström (Stockholm), "Some Evidence Concerning the Nature of Bimaxillary Crowding."
Discussion to be opened by Dr. Friel and Mr. Chapman.
Communication: Miss L. M. Clinch, "The Orthodontic Treatment of Some Cases of Cleft Palate."

May 6 —Demonstration Meeting.
Mr. N. J. Ainsworth, "The Reaction Forces of Orthodontic Appliances."
Mr. Wilson Charles, "The Development of the Mandible and the Eruption of the Teeth." (Serial sections.)
Mr. R. Cutler, "Simple Points in Technic."
Mr. H. C. Highton, "Indirect Method of Making Bands."
Mr. R. E. Rix, "Some Useful Types of Apparatus."
Mr. H. Watkin, "Technic of Making Tubes From Stainless Steel Sheet and Automatic Welding."

Oct. 7 —Paper: Mr. H. T. A. McKeag, "The Design of Orthodontic Appliances."
Discussion to be opened by Dr. Friel and Mr. Watkin.
Communication: Mr. N. Gray, "Some Problems in Stainless Steel Technic."

Nov. 4 —Paper: Mrs. R. Lindsay, "A Review of the Orthodontic Literature of the Past Year."
Discussion to be opened by Mr. Pitts.
Communication: Mr. R. O. Barber, "Prenormal Occlusion, True and Apparent."

Dec. 2 —Annual general meeting.
Case Reports for Discussion.
Mr. Chapman.
Mr. Sturrock.

The Officers of the Society are:

President: A. L. Packham.
Immediate Past President: B. Samuel.
Vice Presidents: F. B. Bull,
F. St. J. Steadman,
Mrs. R. Lindsay.
Councillors: N. Gray,
S. A. Riddett,
H. Chapman.
Treasurer: H. R. Evans,
3, Park Crescent, W. 1.
Secretary: R. Cutler,
8, Lower Sloane Street, S. W. 1.
Curator: H. C. Highton.
Editor: M. A. Rushton.
Librarian: Miss K. C. Smyth.
Auditors: L. Boness,
J. A. Hudson.

The Society possesses a library and a museum, the former containing a number of books on orthodontics which are available for the use of members; the latter houses appliances, models, etc., of a similar nature which also may prove of interest to members.